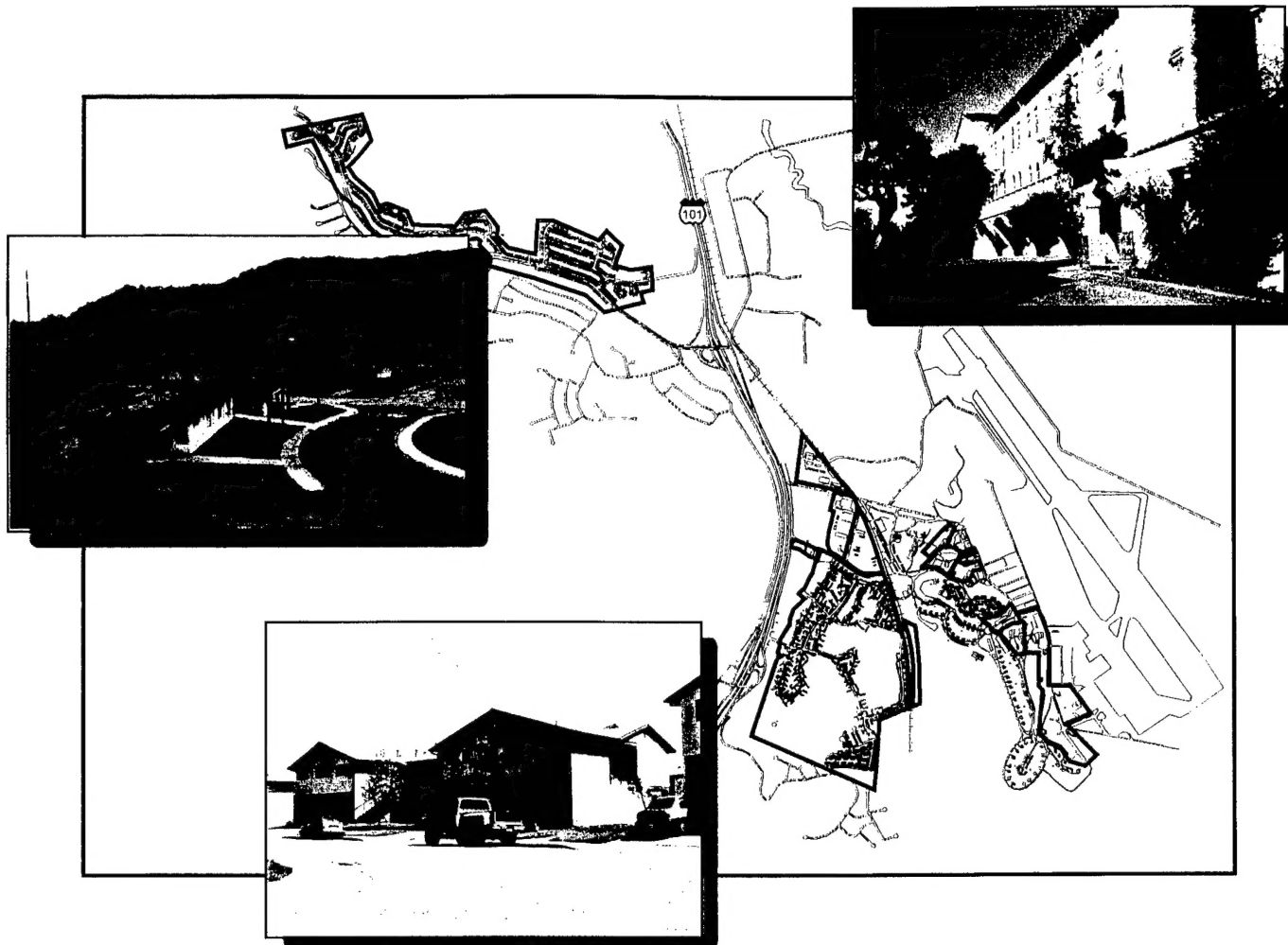


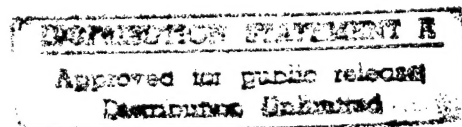
Draft Environmental Impact Statement for the Disposal and Reuse of the Department of Defense Housing Facility Novato, California



Volume II

January 1997

U.S. Navy
Engineering Field Activity West
900 Commodore Drive
San Bruno, California 94066



DTIC QUALITY INSPECTED 2

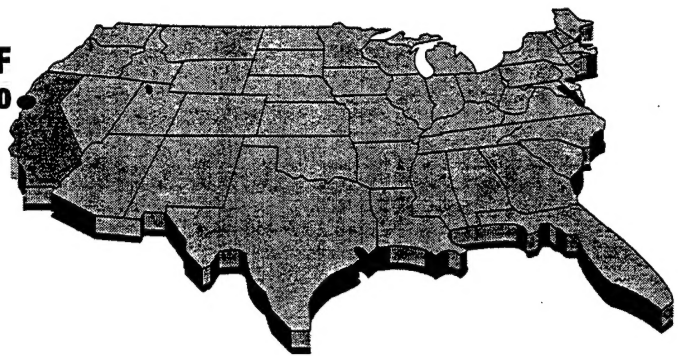
19970131 050

DRAFT
ENVIRONMENTAL IMPACT STATEMENT FOR THE
DISPOSAL AND REUSE OF DEPARTMENT OF DEFENSE HOUSING FACILITY
NOVATO, CALIFORNIA

VOLUME II
TECHNICAL APPENDICES

<u>Appendix</u>		<u>Page</u>
C	LAND USE.....	C-1
D	UTILITIES.....	D-1
E	CULTURAL RESOURCES.....	E-1
F	BIOLOGICAL RESOURCES.....	F-1
G	TRAFFIC AND CIRCULATION	G-1
H	FINAL ENVIRONMENTAL BASELINE SURVEY	H-1

**DODHF
Novato**



APPENDIX C

LAND USE

RESIDENTIAL BUILDING LIST

C-2

NONRESIDENTIAL BUILDING LIST

C-3

APPENDIX C LAND USE

As referenced in Section 3.1, Land Use, of this EIS, Appendix C contains background material on the inventory of residential and nonresidential buildings at DODHF Novato.

Table C-1
Summary of DODHF Novato Residential Buildings

	Number of Units	Number Bedrooms	Number Bathrooms	Garage or Carport	Area in Sq. Ft.
Planning Area 1 - Rafael Village					
1 Story Duplex	30	1	1	Carport	782
1 Story Single Detached	148	2	1	Carport	996
1 Story Duplex	158	2	1	Carport	988
1 Story Single Detached	63	3	1	Carport	1,165
1 Story Duplex	<u>106</u>	3	1	Carport	1,080
Total Units	505				
Planning Area 2 - Capehart Housing					
1 Story Duplex	54	2	1	Carport	1,035
1 Story Duplex	48	3	2	Carport	1,180*
2 Story Townhouse	239	3	2	Carport	1,226
1 Story Duplex	32	4	2	Carport	1,275
1 Story Duplex	52	3	2	Carport	1,352
1 Story Duplex	14	3	2	Carport	1,280*
1 Story Duplex	22	4	2	Carport	1,380*
2 Story Townhouse	73	3	2	Carport	1,486
1 Story Duplex	24	4	2	Carport	1,682
<i>Hillside Housing:</i>		2	1	Garage	1,050
2 Story Six-Duplex	<u>150</u>				
Total Units	708				

NOTES: *Indicated units square footage varies in size (approx.). Square footage does not include carport and/or garage. Rafael Village totals include two (2) units which have been demolished by the Navy.

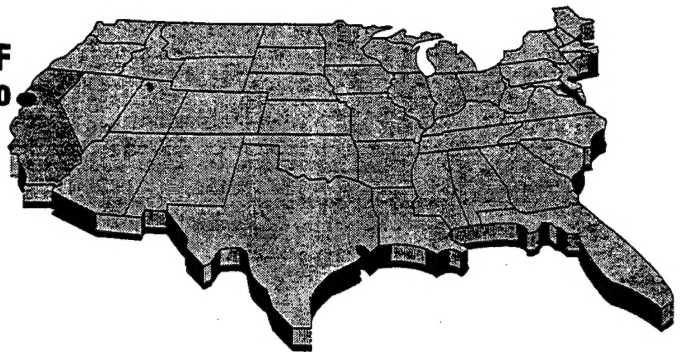
Source: Hamilton Reuse Planning Authority, 1995b.

Table C-2
Summary of DODHF Novato Nonresidential Buildings

Building No.	Existing Use(s)	Size/Construction Year	Past Use(s)
Planning Area 1 - Rafael Village			
404-1	Vacant	1,000 sq.ft./1950	Karate Center, Laundry
Planning Area 2 - Capehart Housing			
	No Non-Residential Structures		
Planning Area 4 - Commissary Triangle			
801*	NEX Material Storage	9,000 sq.ft./1943	Warehouse
802	Vacant (poor condition)	3,688 sq.ft./1942	Morgue/Offices
803*	NEX Food Storage	9,000 sq.ft./1943	Warehouse
804	Commissary	20,000 sq.ft./1942	Commissary
816*	Autohobby Shop	9,500 sq.ft./1943	Auto Shop/Hobby Shop
820*	Material Storage	2,700 sq.ft./1942	Warehouse/Maintenance Shop
821*	Carpentry Shop/Storage	6,300 sq.ft./1942	Carpentry & Maintenance Shop/ Warehouse
826*	Vacant	4,000 sq.ft./1953	Dry Cleaning
827*	Vacant	1,500 sq.ft./1953	Cold Storage
829*	Vehicle Storage	9,400 sq.ft./1944	Commissary/Retail/Warehouse
Planning Area 5 - Exchange Triangle			
914*	Thrift Store	4,320 sq.ft./1942	Mess Hall/Personnel Support
915*	Boy Scouts	1,750 sq.ft./1942	Squadron Headquarters
916*	Cub Scouts	1,500 sq.ft./1942	Supply/Warehouse
930*	Credit Union	4,300 sq.ft./1942	Housing
933*	Girl Scouts	1,750 sq.ft./1942	Barracks, Headquarters
934*	Youth Center	4,324 sq.ft./1942	Barracks
935*	Youth Center	1,500 sq.ft./1942	A.F. Headquarters, Housing
960*	Maintenance Office	3,000 sq.ft./1942	Landscape Maintenance
965*	Shop	660 sq.ft./1958	Auto Maintenance
969*	Storage	3,000 sq.ft./1942	Auto Maintenance
970	Gas Station	4,500 sq.ft./1974	Gas Station
971	Exchange	?/1975	Exchange
972*	PWC Shops/Office/Storage	18,000 sq.ft./1942	Motor Pool, Storage
973	Youth Center	2,200 sq.ft./1943	Automobile Shop
1000	OIC/Administration Office	270 sq.ft./1948	-
504	Security/Art	13,500 sq.ft./1952	HIS House, Thrift Shop
Planning Area 6 - Town Center			
504	Security/Arts	13,500 sq.ft./1942	Motor Pool, Storage
507*	Theater	6,000 sq.ft./1938	Theater
508	Vacant	18,000 sq.ft./1939	CPO Club, Officers' Mess
603*	Chapel	10,700 sq.ft./1960s	Chapel
510*	Vacant	2,100 sq.ft./1942	Infirmary/Clinic
Planning Area 8 - Bowling Alley			
113	Racquetball Court	1994	-
115	Gym/Bowling Alley	20,000 sq.ft./1945	Cryptography Unit
Planning Area 9 - Officers' Club			
201*	Vacant	21,328 sq.ft./1934	BOQ
203*	Community Center	?/1930s	Officers' Club
204*/206	Pool House (Vacant)	?/1938	Pool Bathhouse

*Building which contributes to the Hamilton Historic District.
Source: Hamilton Reuse Planning Authority, 1995b.

**DODHF
Novato**



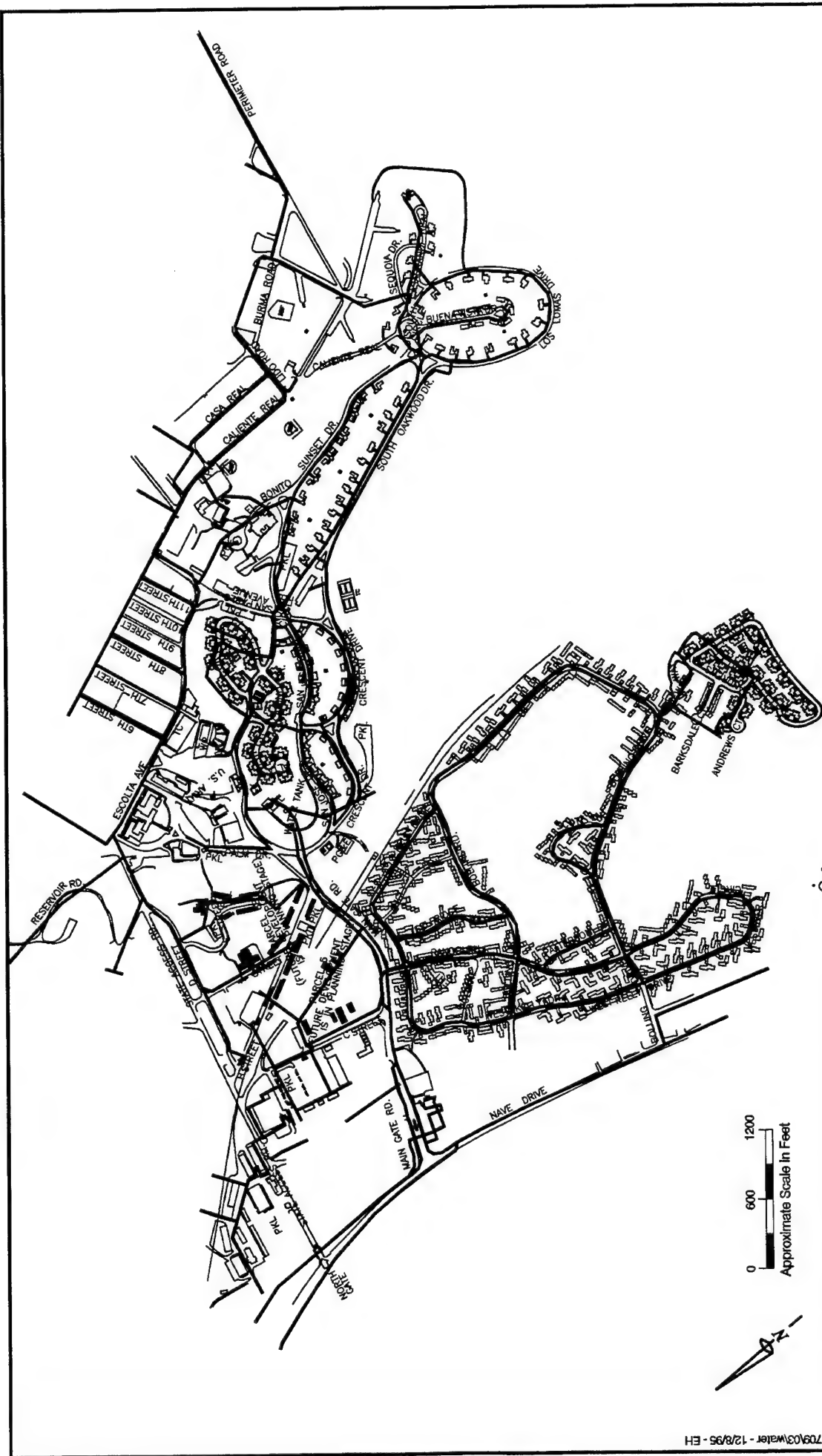
APPENDIX D

UTILITIES

WATER DISTRIBUTION SYSTEM	D-2
SANITARY SEWER SYSTEM	D-4
ELECTRICAL SYSTEM	D-6
NATURAL GAS SYSTEM	D-8

APPENDIX D UTILITIES

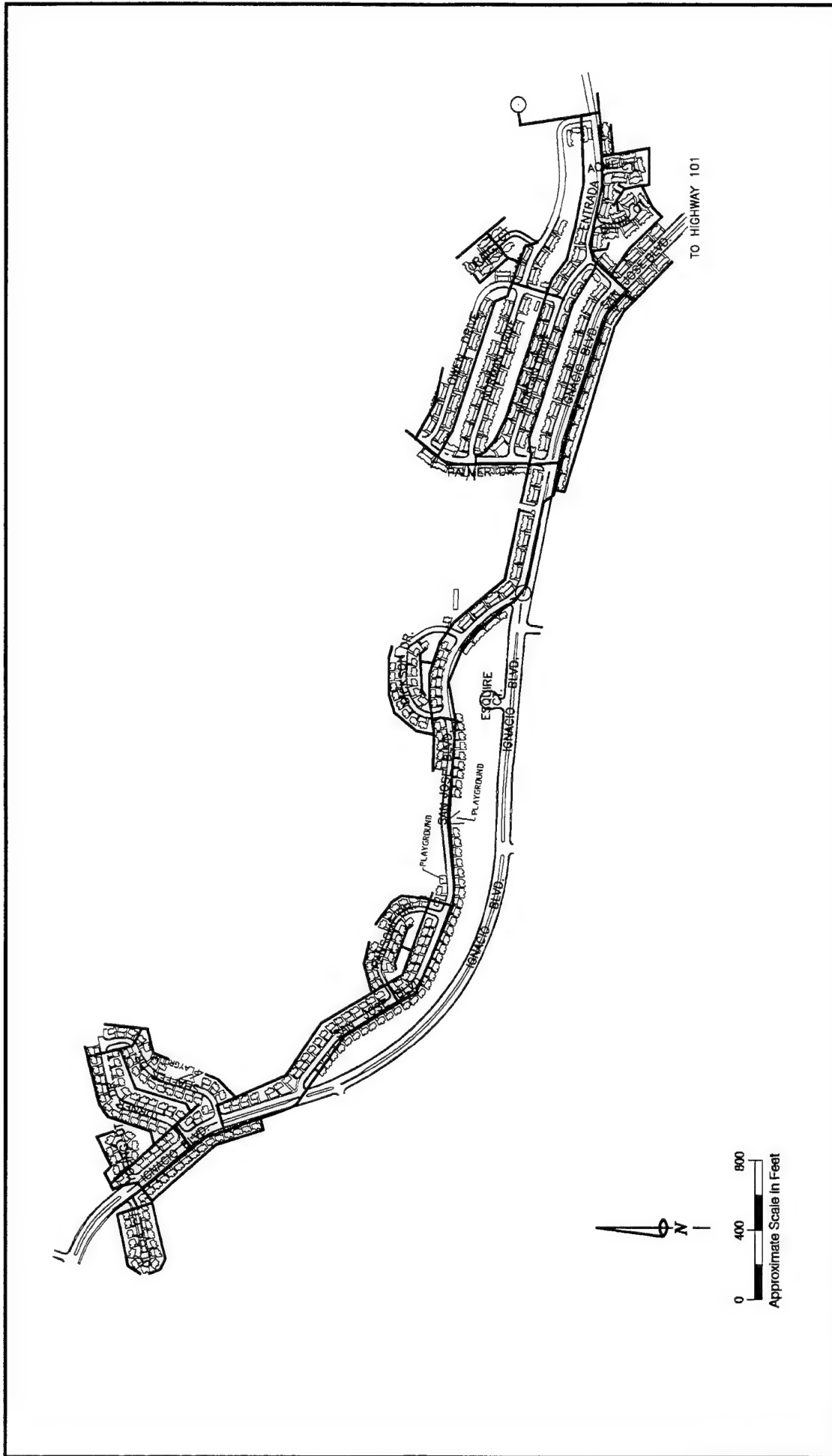
Appendix D contains maps of the utility distribution systems at Rafael Village and the Main Site. The maps were developed from maps contained in the DODHF Novato Master Plan (US Navy 1986) and the Reuse Plan (Hamilton Reuse Planning Authority 1995b) and include the water, sanitary sewer, electrical, and natural gas systems.



The Marin Municipal Water District provides potable and fire protection water to the DOD-HF Main Site, with the exception of a portion of Capehart Housing serviced by the North Marin Water District.

Main Site Water Distribution System
DOD Housing Facility
Novato, California
Figure D-1a

Source: U.S. Navy, 1986



The North Marin Water District provides potable and fire protection water to Rafael Village.

Rafael Village Water Distribution System

DOD Housing Facility
Novato, California

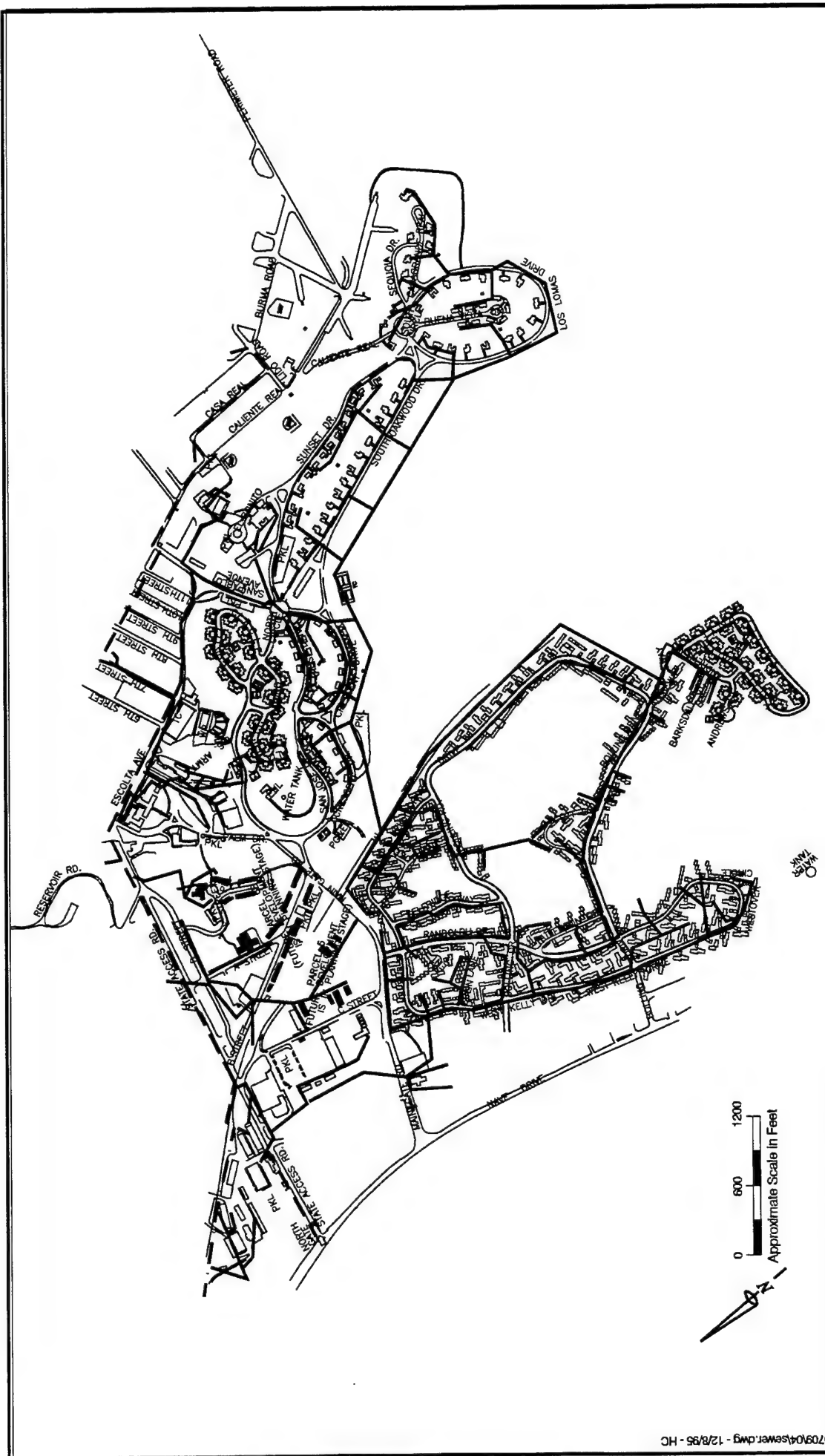
Figure D-1b

LEGEND:

— Water Line

○ Water Tank

Source: U.S. Navy, 1986



Sanitary waste from the Main Site is discharged into the Novato Sanitary District sewer system for treatment at the Ignacio Sewage Treatment Plant.

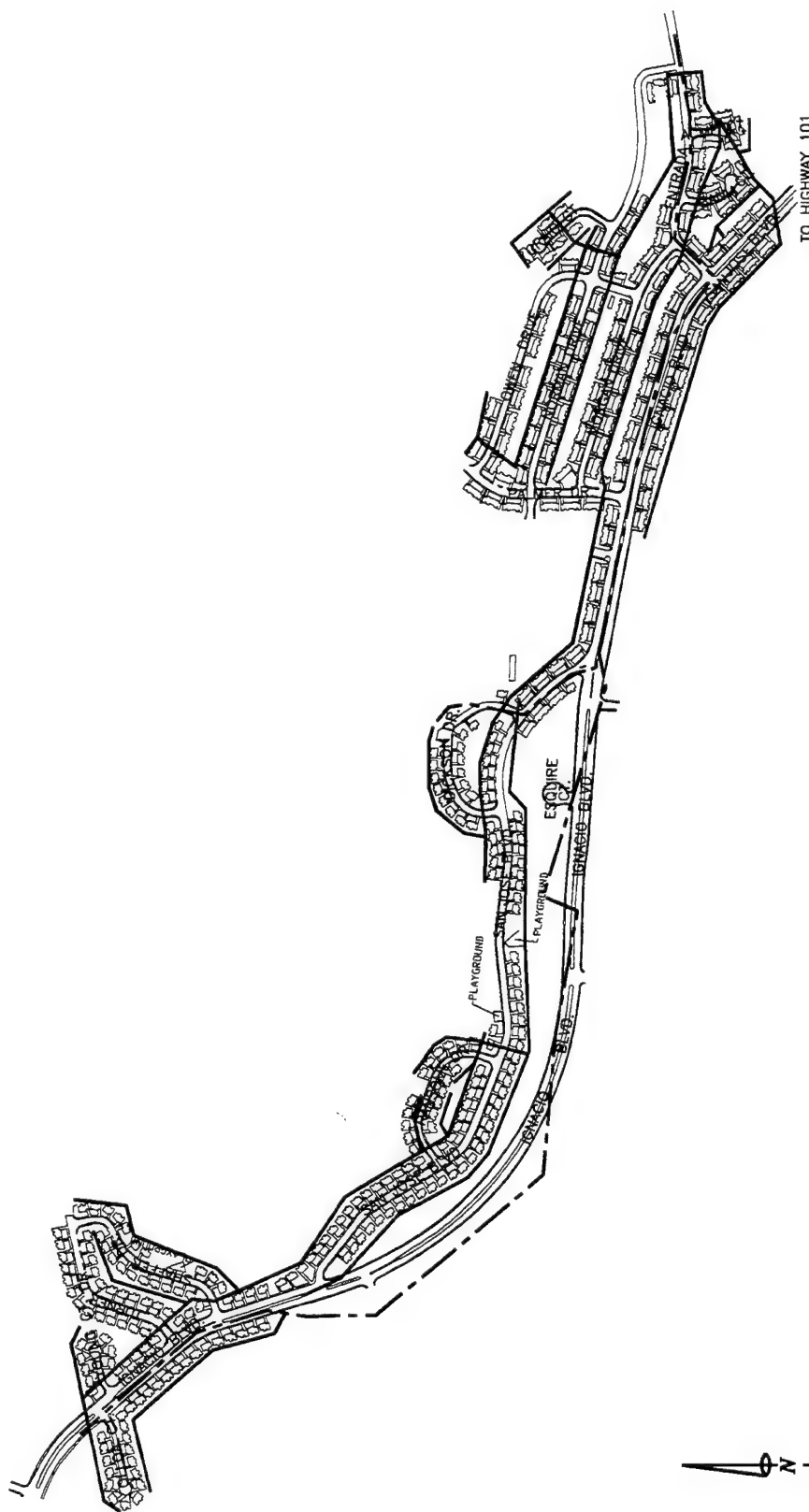
Main Site Sanitary Sewer System

**DOD Housing Facility
Novato, California**

Figure D-2a

- LEGEND:**
- Sewer Line
- Novato Sanitary District Sewer
- Force Main

Source: U.S. Navy, 1986



0709\04\sewer2 - 12/7/95 - HC

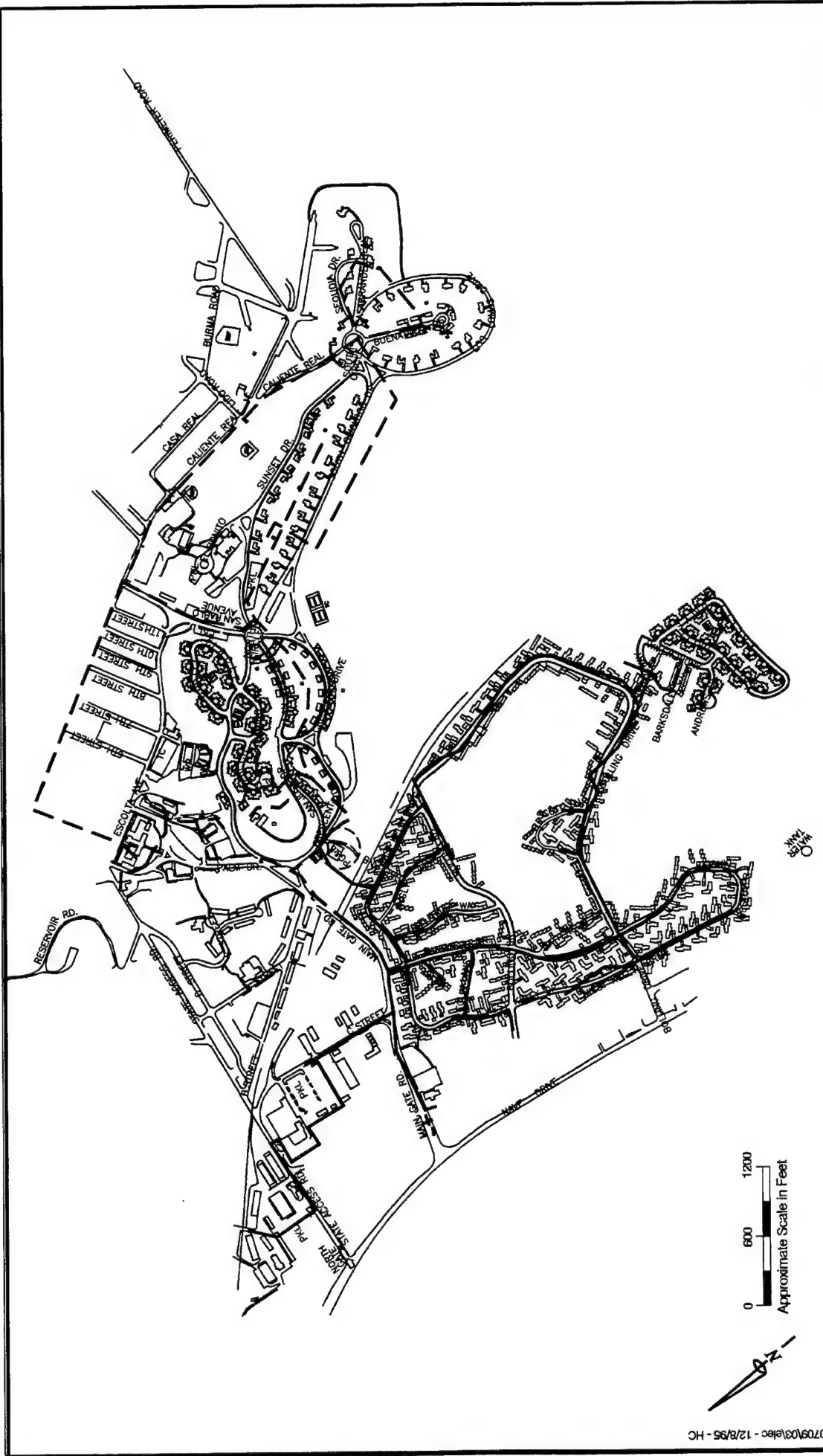
Sanitary waste from Rafael Village is discharged to the Novato Sanitary District sewer system for treatment at the Ignacio Sewage Treatment Plant.

Rafael Village Sanitary Sewer System DOD Housing Facility Novato, California

- LEGEND:**
- Sewer Line
 - - - Novato Sanitary District Sewer

Figure D-2b

Source: U.S. Navy, 1986



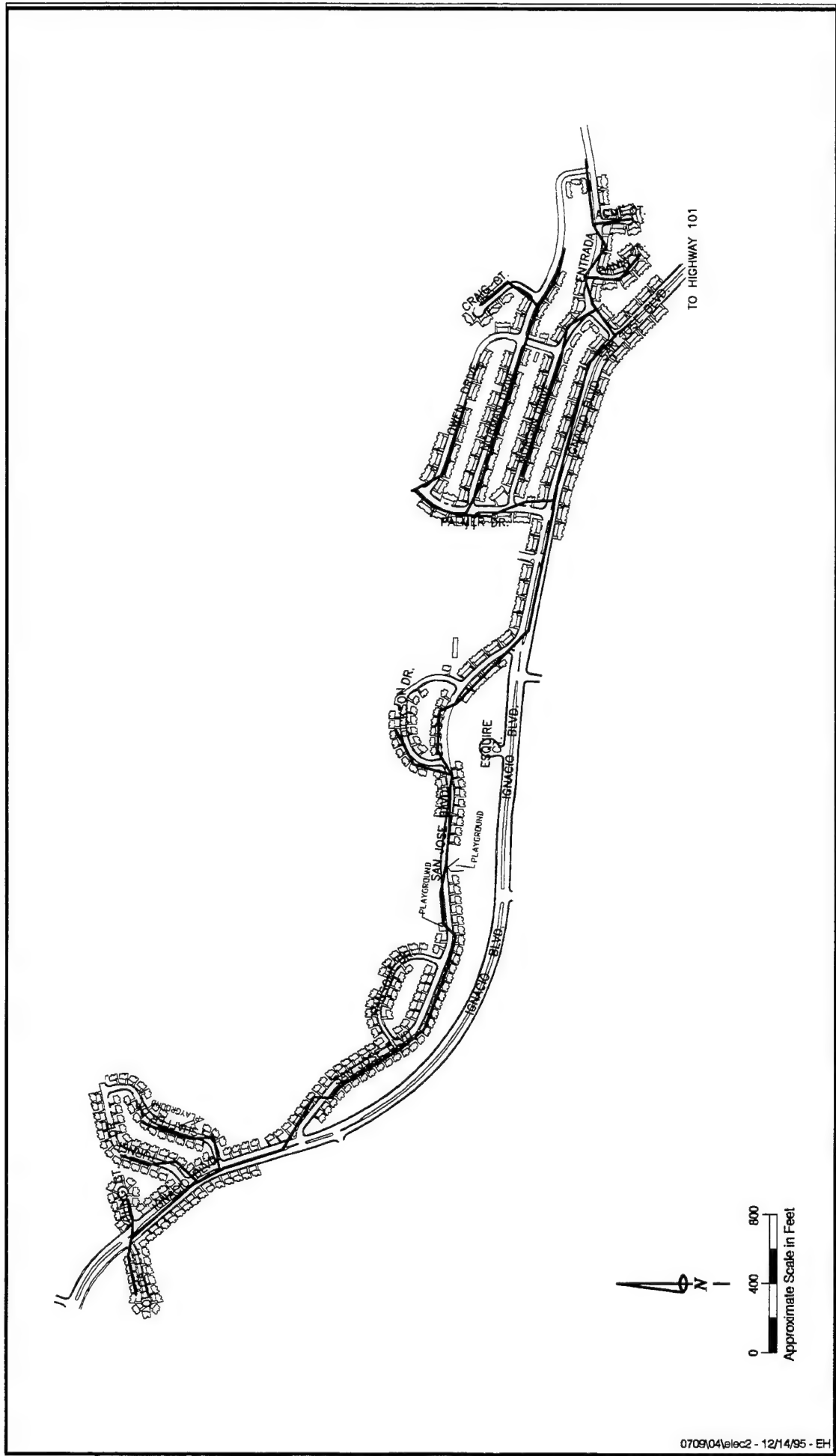
The Main Site electrical system, which receives power from PG&E, is owned and operated by the Navy Public Works Center San Francisco Bay.

Main Site Electrical System

DOD Housing Facility
Novato, California

Figure D-3a

Source: U.S. Navy, 1986



PG&E owns and maintains the electrical system at Rafael Village.

Rafael Village Electrical System DOD Housing Facility Novato, California

Figure D-3b

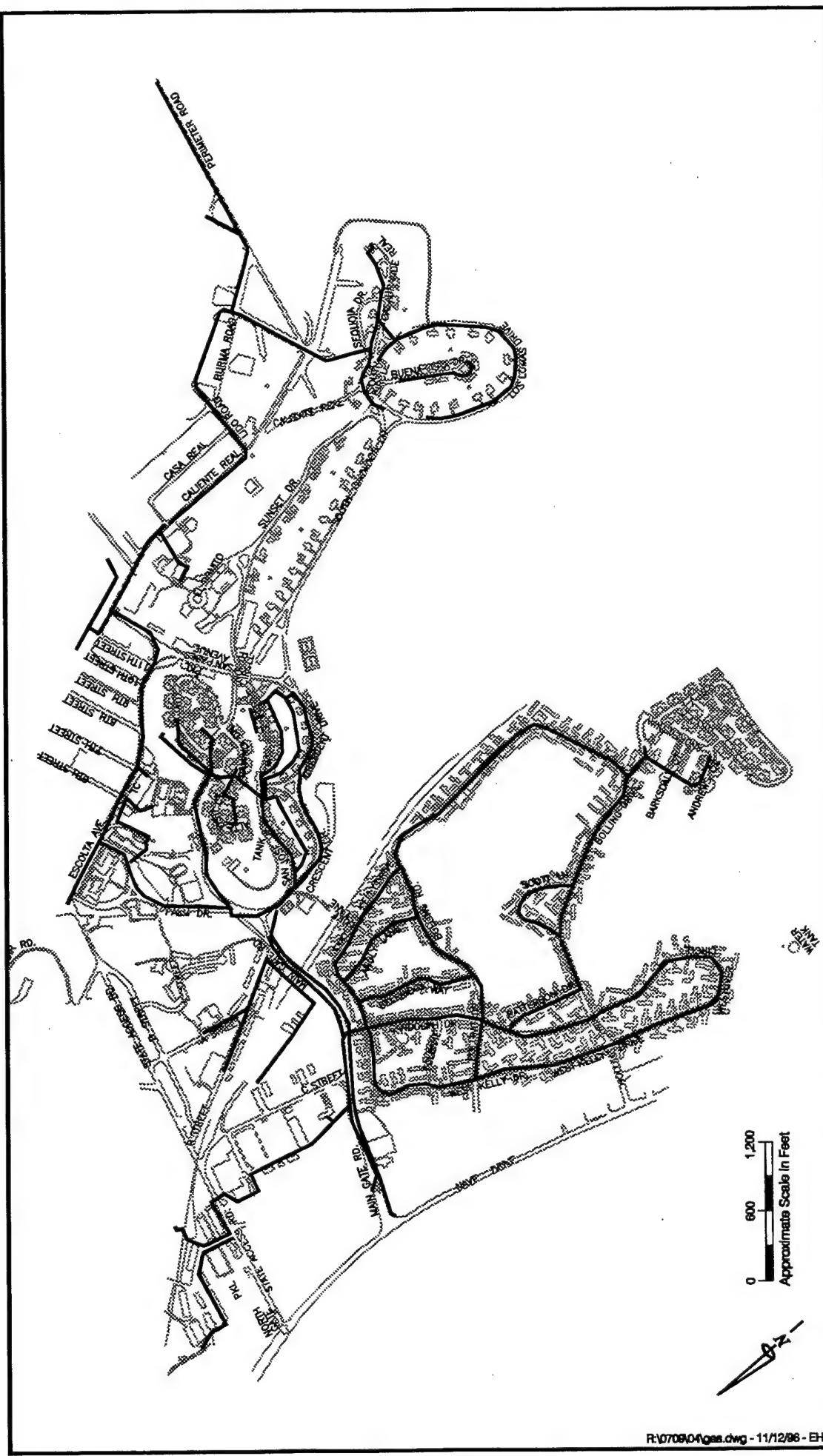
LEGEND:
12.5 KV Overhead Line

Source: U.S. Navy, 1986

Main Site Natural Gas System

DOD Housing Facility
Novato, California

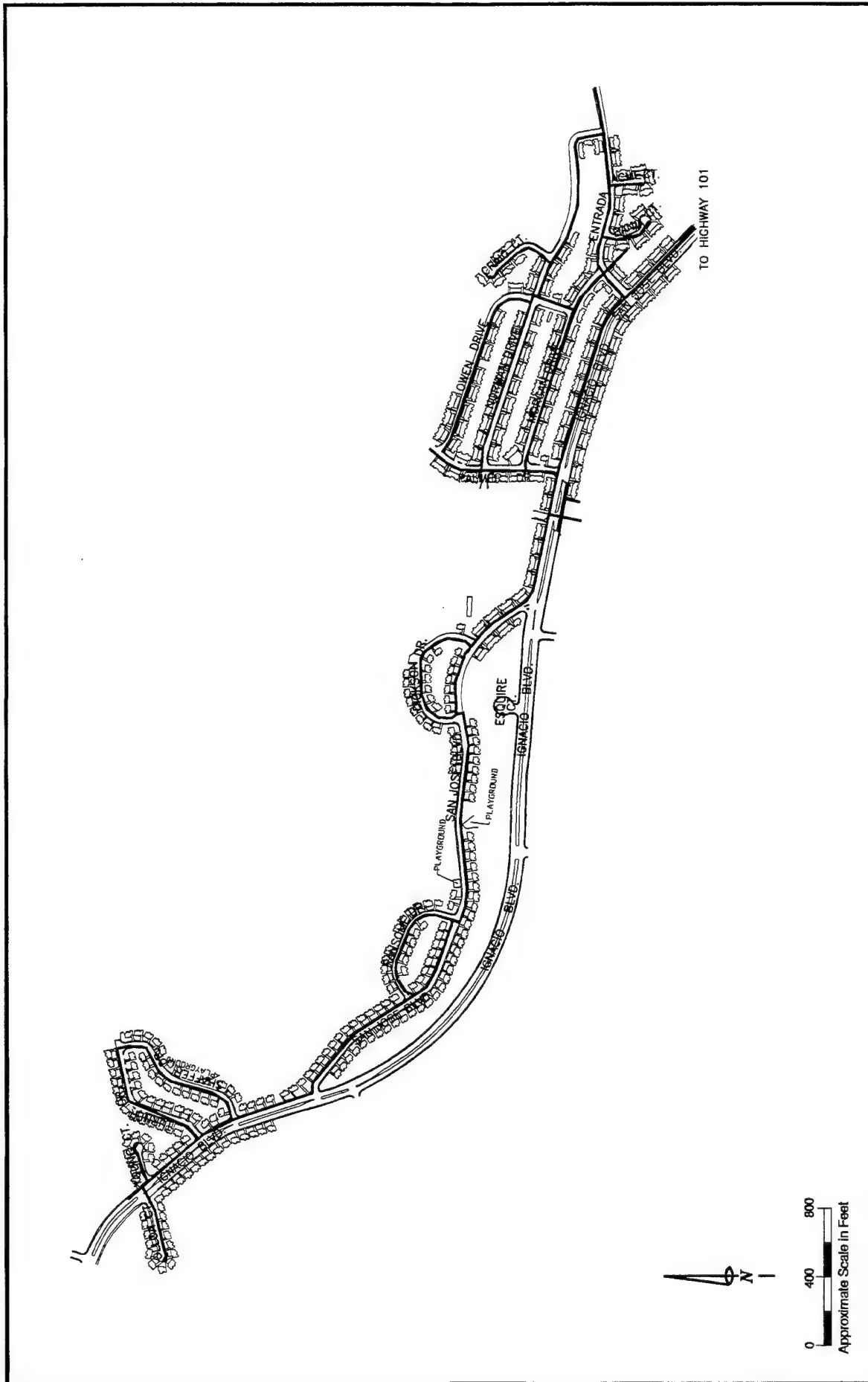
Figure D-4a



The Main Site system, which receives natural gas from PG&E, is owned and operated by the Navy Public Works Center San Francisco Bay.

LEGEND:
Gas Line

Source: U.S., Navy 1986



PG&E owns, maintains, and meters the natural gas system at Rafael Village.

Rafael Village Natural Gas System

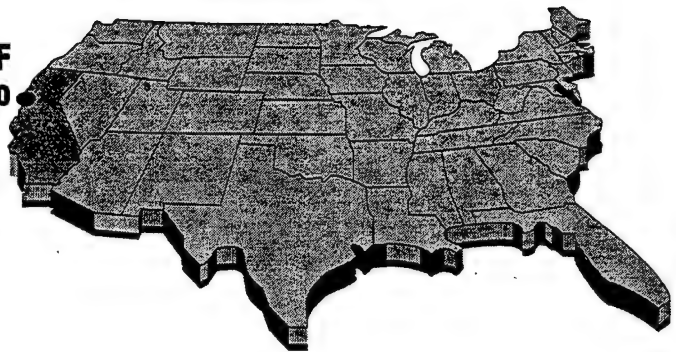
DOD Housing Facility
Novato, California

Figure D-4b

LEGEND:
— Gas Line

Source: U.S. Navy, 1986

**DODHF
Novato**



APPENDIX E

CULTURAL RESOURCES

APPENDIX E CULTURAL RESOURCES

Appendix E contains a listing of the buildings and structures at DODHF Novato. The last column in Table E-1 indicates if the building is a noncontributing building (NCB), noncontributing structure (NCS), contributing building (CB), or contributing structure (CS) to the Hamilton Army Airfield Historic District.

Table E-1
Historic Status of DODHF Novato Buildings

Building No.	Existing Use	Past Use	Construction Date	National Register Status
Planning Area 1 - Rafael Village				
Housing	Rafael Village Development	Residential, recreational	1951	NC - not included in historic district boundaries
Planning Area 2 - Capehart Housing				
Housing	Capehart Housing Development	Residential	1960 - 1963	NC - not included in historic district boundaries
Planning Area 4 - Commissary Triangle				
801	NEX Storage Warehouse	NEX Storage Warehouse	1943	CB
802	Vacant	Administrative Headquarters for Morgue, NEX/Air Force Commissary	1942	CB
803	Paper, Food and Dry Product Storage Warehouse for NEX Commissary	Paper, Food and Dry Product Storage Warehouse for NEX Commissary	1943	CB
804	Commissary	Commissary	1942	NCB
816	Auto Hobby Shop, Self-service Auto Maintenance Facility	Auto, Metal and Wood Hobby Shops/Recreation	1943	CB
820	Storage	Warehouse and Equipment Maintenance Shop/ Air Group Headquarters	1943	CB
821	Carpentry Shop, Storage	Carpentry Shop, Equipment Maintenance Shop and Warehouse	1942	CB
826	Vacant	Dry Cleaning/ Laundry Facility, Cold Storage Facility	-	NCB
827	Vacant	Cold Storage Shed	-	NCS
829	Vehicle, Furniture and Scrap Lumber Storage	Commissary, General Store, NEX/Retail Store, and Warehouse for NEX	1944	CB
Planning Area 5 - Exchange Triangle				
-	Bridges (2)	Bridges	1932	CS
550	Latrines	Sentry Station	1934	CB

Table E-1
Historic Status of DODHF Novato Buildings (continued)

Building No.	Existing Use	Past Use	Construction Date	National Register Status
914	Thrift Shop	Dining Hall, Mess Hall, Expansion Housing and Personnel Support	1942	CB
915	Recreation Activities for Boy Scouts of America	Squadron Headquarters, Lounge, Toy Store, and Housing and Personnel Support Facility	1942	CB
916	Storage for Boy Scouts of America	Supply and Equipment Room, Warehouse, and Housing and Personnel Support Facility	1942	CB
930	Credit Union	Barracks, Air Force Headquarters, and Housing and Personnel Support Activities	1942	CB
933	Recreation Activities for Boy Scouts and Girl Scouts	Air Force Division Headquarters, Barracks, Recreation, Housing, and General Support	1942	CB
934	Youth Center	Air Force Barracks, Recreation, Housing, General Support, Mess Hall and a PX Shop	1942	CB
935	Ceramics Shop and Activity Room for the Youth Center	Air Force Division Headquarters, Expansion Housing and Personnel Support	1942	CB
960	Contractor's Office and Shop	Automobile Maintenance Shop and Tire Shop	1942	CB
965	Contractor's Shop and Work Area	Automobile Maintenance Shop	1942	NCS
969	PWC Shop Storage	Automobile Maintenance Shop	1942	CB
970	Navy Exchange Service Station	Fuel Station	1953	NCB
971	Navy Exchange	Exchange	1953	NCB
972	PWC Shops, Administrative Offices, and Storage	Automobile Maintenance Shop and Motor Pool	1942	CB
973	Youth Recreation Center	Automobile Maintenance Shop	1942	NCB
1000	Housing Office, Garden and Maintenance Storage	Housing Office, Garden and Maintenance Storage	1948	NC - outside historic district boundaries

Table E-1
Historic Status of DODHF Novato Buildings (continued)

Building No.	Existing Use	Past Use	Construction Date	National Register Status
Planning Area 6 - Town Center				
504	Base Security Offices, Telephone Control Station, Folk Art Gallery	Thrift Shop, Health Clinic, HIS House, Arts and Crafts Facility, Base Communications Facility, Telephone Exchange. Used by Cryptography Unit	1952	NCB
505	Utility Vault	Electrical Switch Station	1938	CS
507	War Department Theater	War Department Theater	1938	CB
508	Vacant	Chief Petty Officers' Club, Recreation Club	1939	CB
510	Vacant	Infirmary	1941	CB
603	Chapel	Chapel	1950s	NCB
Planning Area 8 - Bowling Alley				
111	Temporary Housing 1	Bachelor Officers' Quarters	1940	CB
113	Indoor Racquetball Court	Outdoor Racquetball Court	1994	NCS
115	Gym/Bowling Alley	Gym/Bowling Alley	1942	CB
Planning Area 9 - Officers' Club				
201	Vacant	Bachelor Officers' Quarters	1934	CB
203	Community Center, Library, Special Services office, and Officers' club	Officers' Club	1934	NCB
204	Swimming Pool Bathhouse	Swimming Pool Bathhouse	1935	NCB
205	Swimming Pool	Swimming Pool or Water Supply Storage	1935	CS
206	Officers' Mess/ Cabana Club	Mess Hall, Lounge	1944	NCB
208	Swimming Pool Heating System	Swimming Pool Heating System	1962	NCS
209	Swimming Pool Water Treatment System	Swimming Pool Water Treatment System	1971	NCS

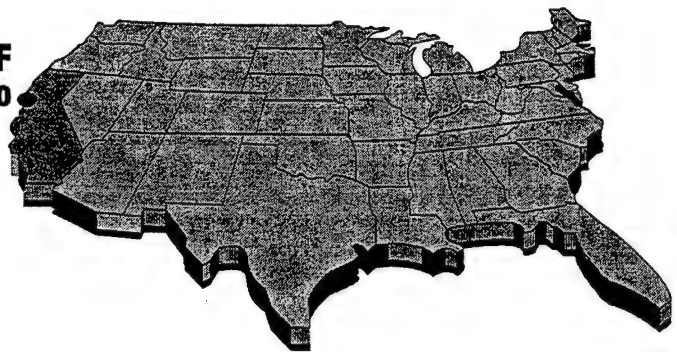
Table E-1
Historic Status of DODHF Novato Buildings *(continued)*

Building No.	Existing Use	Past Use	Construction Date	National Register Status
Planning Area 10 - Ballfield				
-	Athletic Fields	Athletic Fields	1970s	NCS
191	Loading Magazine	Arms and Ammunition Magazine	1934	CS
193	Recreational Equipment Storage	Transformer Vault and Switch Station	1934	CS

KEY:

- NC - Non-contributing
- NCB - Non-contributing Building
- NCS - Non-contributing Structure
- CB - Contributing Building
- CS - Contributing Structure

**DODHF
Novato**



APPENDIX F

BIOLOGICAL RESOURCES

BIOLOGICAL SURVEY	F-2
USFWS LETTER	F-21
PLANT SPECIES LIST	F-24
ANIMAL SPECIES LIST	F-30
CALIFORNIA RED-LEGGED FROG SPRING AND SUMMER SURVEYS	F-34

APPENDIX F BIOLOGICAL RESOURCES

Appendix F contains the Biological Survey prepared for the DODHF Novato site. The survey summarizes the findings of a literature search and two field surveys on vegetation communities and sensitive species and habitats in the DODHF Novato area. Appendix F also contains a USFWS letter with an updated species list for Bay Area Naval Facilities and plant and animal species lists compiled from field guides and field surveys.

Note: As the Red-legged frog was listed as a threatened species on June 24, 1996, its status is described as "proposed for listing as a federally threatened species" in the first survey report prepared in February 1996, but is listed as a federally threatened species in the second report, prepared in August 1996.

Biological Survey

DODHF Novato Marin County, California

ABSTRACT

Two surveys were conducted in January 1996; a survey to map the existing vegetation communities and a survey to determine potential sensitive species habitat at the Department of Defense Housing Facility, Novato (DODHF Novato) in Marin County, California. These surveys were conducted in support of the Environmental Impact Statement for the disposal of DODHF Novato by the Navy and reuse by the local community. Background research was conducted to collect available information on vegetation communities at DODHF Novato, sensitive species that may inhabit the region, and the habitat requirements of these species. Surveys were conducted and resulted in the definition of ten vegetation communities on DODHF Novato and in adjacent areas. Five of these communities are listed as sensitive habitats by the California Department of Fish and Game; three of these five exist within the boundaries of DODHF Novato. Habitats on DODHF Novato could support two endangered fish species (the tidewater goby and winter-run chinook salmon), one amphibian proposed for endangered listing (the California red-legged frog), and four plant and nine animal species with lesser protections. Additional surveys are recommended to delineate wetlands on DODHF Novato and to determine the presence or absence of sensitive fish and amphibian species.

Prepared for:

US Navy Field Engineering Activity West
900 Commodore Drive
San Bruno, California 94066

Prepared by:

Buescher Biological Consulting
5619 Santa Cruz Avenue
Richmond, California 94804

Under contract to:

Tetra Tech
180 Howard Street, Suite 180
San Francisco, California 94105

FEBRUARY 1996

TABLE OF CONTENTS

Page No.

1.0 INTRODUCTION.....	4
1.1 PURPOSE AND NEED FOR SURVEYS.....	4
1.2 SURVEY AREA LOCATION AND DESCRIPTION	4
2.0 METHODS.....	5
2.1 PRELIMINARY RESEARCH.....	5
2.2 VEGETATION COMMUNITIES	8
2.3 SENSITIVE SPECIES HABITAT.....	8
3.0 RESULTS	9
3.1 VEGETATION COMMUNITIES	9
3.2 SENSITIVE SPECIES HABITAT.....	10
4.0 DISCUSSION	12
4.1 VEGETATION COMMUNITIES	12
4.2 SENSITIVE SPECIES HABITAT.....	15
5.0 REFERENCES	19

LIST OF TABLES

LIST OF ACRONYMS	3
------------------------	---

LIST OF ACRONYMS	3
------------------------	---

LIST OF ACRONYMS

CDFG	California Department of Fish and Game
CNPS	California Native Plant Society
COE	US Army Corps of Engineers
EIS	Environmental Impact Statement
NEPA	National Environmental Policy Act
DODHF	Department of Defense Housing Facility
USFWS	US Fish and Wildlife Service

1.0 INTRODUCTION

1.1 Purpose and Need for Surveys

The Department of Defense Housing Facility, Novato (DODHF Novato) is scheduled for disposal by the US Navy (Navy) and reuse by the local community. This survey was conducted in support of the Environmental Impact Statement (EIS) for these disposal and reuse actions.

The Navy submitted a letter to the US Fish and Wildlife Service (USFWS) on November 23, 1993 to solicit their input on a number of projects under Section 7 of the Endangered Species Act. The Navy received a reply from the USFWS dated March 5, 1994, one enclosure of which presented a list of species of concern at DODHF Novato (USFWS 1994a). A copy of this letter is presented as Appendix F-2.

Two surveys were conducted. The purpose of one survey was to map the existing vegetation communities and one survey defined areas of potential sensitive species habitat at DODHF Novato.

In this report, sensitive species are defined as those that are listed by the USFWS or by the California Department of Fish and Game (CDFG) as endangered, threatened, proposed for endangered or threatened status, or candidate species for endangered or threatened status. Also included as sensitive species are those listed by the California Native Plant Society (CNPS) and species listed as California species of special concern by the CDFG.

1.2 Survey Area Location and Description

The survey area included the lands within the area defined as the DODHF Novato. DODHF Novato encompasses approximately 481 acres within the city of Novato in Marin County, California, on both the west and east sides of Highway 101 in the southeastern part of the city. On the east side of Highway 101 DODHF Novato is comprised of about 383 acres that includes two housing areas, Capehart Housing and Spanish Housing, as well as a community services area that provides many services to DODHF Novato including a bowling alley, commissary, officer's club, and baseball fields. Rafael Village is a housing area of about 98 acres on the west side of Highway 101. Elevations on DODHF Novato range from sea level surrounding Spanish Housing to approximately 160 feet at hills within Capehart Housing and at Rafael Village.

2.0 METHODS

This section presents the methods that were used in preliminary research prior to conducting surveys and the methods used during the surveys for vegetation communities and for sensitive species habitat.

2.1 Preliminary Research

Prior to conducting the field survey, information on vegetation communities and sensitive species that may be found at DODHF Novato was collected. The results of this preliminary research are presented in Chapter 3.

Vegetation Communities

Preliminary vegetation community maps were drawn from older vegetation maps for the part of the facility on the east side of Highway 101 (US Navy 1986). No previous data was available for the Rafael Village area. The National Wetlands Inventory map for the Novato quad (National Wetlands Inventory 1985) provided preliminary information on wetlands within the region.

Sensitive Species Habitat

To supplement the list provided by the USFWS (USFWS 1994a), other sources were investigated to determine sensitive species with the potential to inhabit DODHF Novato. These sources included the California Natural Diversity Data Base (CDFG 1995a), the Master Plan (US Navy 1986), the Hamilton Army Airfield Reuse Plan (Hamilton Reuse Planning Authority 1995), the Fish and Wildlife Management Plan (US Navy 1988), and the Flood Control and Maintenance Plan for San Jose Creek and Pacheco Creek (US Navy 1987).

Through reviewing these sources, it was determined that eight species listed as endangered, threatened, or proposed for threatened or endangered status could inhabit DODHF Novato based on the location of the facility (Table 1). Habitat requirements for these species were researched and are presented in Table 1 and further discussed in Chapter 4. Surveys for sensitive species habitat focused on these eight species.

Additionally, nineteen other sensitive species (category 2 candidate species, California species of special concern, or species listed by the CNPS) were identified through this research as potentially inhabiting

DODHF Novato (Table 2). Habitat requirements for these species are also presented on Table 2.

TABLE 1
ENDANGERED AND THREATENED SPECIES IN THE VICINITY OF DODHF-
NOVATO¹

Common Name Scientific Name	Federal/State /CNPS Status	Preferred Habitat	Source
<i>Plants</i>			
soft bird's beak <i>Cordylanthus mollis</i> ssp. <i>mollis</i>	PE/R/1B	salt and brackish marsh	USFWS 1994c; USFWS 1995; Skinner 1994; Hickman 1993
Marin western flax <i>Hesperolinon congestum</i>	T/T/1B	serpentine grasslands	CDFG 1995a; Skinner 1994; Hickman 1993
<i>Fish</i>			
tidewater goby <i>Eucyclogobius newberryi</i>	E/CSC/none	slow moving lower reaches of coastal streams	USFWS 1994c; CDFG 1995a; McGinnis 1984
winter-run chinook salmon <i>Oncorhynchus tshawytscha</i>	E/E/none	coastal streams and rivers in the northern bay area	USFWS 1994c; McGinnis 1984
<i>Amphibians</i>			
California red-legged frog <i>Rana aurora draytonii</i>	PE/CSC/none	ponds or slow moving streams with aquatic vegetation and tree cover	USFWS 1994c; Allaback 1996; Stebbins 1985
<i>Birds</i>			
California black rail <i>Laterallus jamaicensis coturniculus</i>	C2/E/none	tidal marshes	CDFG 1995a; National Geographic Society 1992
California clapper rail <i>Rallus longirostris obsoletus</i>	E/E/none	salt and brackish marsh	CDFG 1995a; National Geographic Society 1992
<i>Mammals</i>			
salt marsh harvest mouse <i>Reithrodontomys raviventris</i>	E/E/none	coastal salt marsh dominated by pickleweed	USFWS 1994c; CDFG 1995a; Ingles 1965

Federal Status

E = Endangered
PE = Proposed endangered
T = Threatened
C2 = Category 2 candidate

State Status

E = Endangered
T = Threatened
R = Rare
CSC = California species of special concern

California Native Plant Society (CNPS) Status

1B = Plants rare and endangered in California and elsewhere

TABLE 2
OTHER SENSITIVE SPECIES IN THE VICINITY OF DODHF-NOVATO¹

Common Name Scientific Name	Federal/State/ CNPS Status	Preferred Habitat	Source
<i>Plants</i>			
Point Reyes bird's-beak <i>Cordylanthus maritimus</i> ssp. <i>palustris</i>	C2/none/1B	coastal salt marsh	USFWS 1994c; Skinner 1994; Hickman 1993
dwarf downingia <i>Downingia pusilla</i>	C3c/none/1B	vernal pools or ditches with heavy clay soils	CDFG 1995a; Skinner 1994; Hickman 1993
fragrant fritillary <i>Fritillaria liliacea</i>	C2/none/1B	heavy soils on open hills near coast	USFWS 1994c; Skinner 1994; Hickman 1993
Baker's navarretia <i>Navarretia leucocephala</i> ssp. <i>bakeri</i>	none/none/1B	vernal pools or grasslands	CDFG 1995a; Skinner 1994; Hickman 1993
Marin knotweed <i>Polygonum marinense</i>	C2/none/1B	coastal salt marsh	USFWS 1994c; Skinner 1994; Hickman 1993
Mount Tamalpais jewelflower <i>Streptanthus glandulosus</i> var. <i>pulchellus</i>	C3c/none/1B	grasslands or open conifer and oak woodlands away from the coast	CDFG 1995a; Skinner 1994; Hickman 1993
<i>Invertebrates</i>			
California brackishwater snail <i>Tryonia imitator</i>	C2/none/none	estuaries in bay area	CDFG 1995a
<i>Fish</i>			
green sturgeon <i>Acipenser medirostris</i>	C2R/none/none	large rivers from bay area north	USFWS 1994c; McGinnis 1984
longfin smelt <i>Spirinchus thaleichthys</i>	C2/CSC/none	lower reaches of rivers and streams, estuaries in bay area	USFWS 1994c; McGinnis 1984
<i>Amphibians</i>			
foothill yellow-legged frog <i>Rana boylei</i>	C2/CSC/none	ponds or slow moving streams with aquatic vegetation and tree cover	USFWS 1994c; Stebbins 1985
<i>Reptiles</i>			
northwestern pond turtle <i>Clemmys marmorata marmorata</i>	C2/CSC/none	larger streams and irrigation ditches with aquatic vegetation and rock or mud substrate	USFWS 1994c; Stebbins 1985
<i>Birds</i>			
Cooper's hawk <i>Accipiter cooperi</i>	none/CSC/none	mature riparian areas, forests, and woodlands	CDFG 1995a; National Geographic Society 1992
burrowing owl <i>Athene cunicularia</i>	none/CSC/none	grasslands and open woodlands	CDFG 1995a; National Geographic Society 1992
California horned lark <i>Eremophila alpestris</i>	C2/CSC/none	grasslands and open woodlands	USFWS 1994c; National Geographic Society 1992
loggerhead shrike <i>Lanius ludovicianus</i>	C2/CSC/none	grasslands and open woodlands	USFWS 1994c; National Geographic Society 1992
<i>Mammals</i>			
Point Reyes jumping mouse <i>Zapus trinotatus orarius</i>	C2/CSC/none	meadows in coniferous forests	USFWS 1994c; Ingles 1965
Point Reyes mountain beaver <i>Aplodontia rufa phaea</i>	C2/CSC/none	streamside coniferous, willow, and alder forest	USFWS 1994c; Ingles 1965
pallid bat <i>Antrozous pallidus</i>	C2/CSC/none	vacant buildings	US Navy 1988; Ingles 1965
Townsend's western big-eared bat <i>Plecotus townsendii townsendii</i>	C2/CSC/none	vacant buildings	USFWS 1994c; Ingles 1965
California mastiff bat <i>Eumops perotis californicus</i>	C2/CSC/none	vacant buildings	USFWS 1994c; Ingles 1965

Federal Status

C2 = Category 2 candidate

C2R = Proposed for category 2 status

C3c = Removed from the list

State Status

CSC = California species

of special concern

California Native Plant Society (CNPS) Status

1B = Plants rare and endangered
in California and elsewhere

2.2 Vegetation Communities

Revised vegetation maps were drawn by field checking data for the east side of Highway 101, correcting errors, and adding information for adjacent off site areas. Original vegetation community maps were drawn for Rafael Village and the surrounding area. Vegetation communities were based on field observations and definitions in *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986).

2.3 Sensitive Species Habitat

To determine the potential for sensitive species to inhabit DODHF Novato, native habitats on the site and in adjacent areas were inspected to determine whether the habitat requirements for these species were available. The riparian corridors along San Jose Creek adjacent to Rafael Village, Pacheco Creek in Capehart Housing, and the drainage ditches adjacent to Rafael Village, Capehart Housing, and Spanish Housing were surveyed by walking along the center of the drainage as much as possible or from the top of either bank as access allowed. All riparian and drainage areas on or adjacent to DODHF Novato were surveyed completely. Off site riparian areas for both San Jose and Pacheco Creeks were examined as far upstream and downstream from DODHF Novato as access allowed. Transects were walked throughout other native habitats on DODHF Novato. Adjacent areas inspected from DODHF Novato and from off-site as road access allowed.

3.0 RESULTS

This section presents the results of the survey to map existing vegetation communities and the results of the survey for sensitive species habitat on DODHF Novato. More detailed discussion of these results is presented in Chapter 4 and lists of plant and animal species detected during these surveys are presented in Appendix F-3.

Surveys were conducted on four days, Monday, January 22, Thursday, January 25, Friday, January 26, and Monday, January 29, 1996. Monday, January 22, was mostly cloudy with cloud cover ranging from about 50 to 100 percent. The temperature ranged from approximately 50 to 65 degrees Fahrenheit. Surveys were conducted between 0900 and 1700. Between January 22 and the second day of surveying on Thursday, January 25, several more inches of rain had fallen in the area. Cloud cover ranged from 60 to 100 percent and temperatures ranged from approximately 50 to 60 degrees Fahrenheit. Surveys were conducted between 0900 and 1600. Friday, January 26, was warmer and more humid with cloud cover ranging from about 20 to 60 percent. The temperature ranged from approximately 50 to 65 degrees Fahrenheit. Surveys were conducted between 0800 and 1700. Environmental conditions on Monday, January 29, were similar to those on Friday, January 26 with partly sunny skies (cloud cover ranging from about 20 to 50 percent) and humid. The temperature ranged from approximately 50 to 65 degrees Fahrenheit. Surveys were conducted between 0900 and 1700.

3.1 Vegetation Communities

Ten vegetation communities were mapped during this survey at DODHF Novato. Five of these are considered sensitive communities by the CDFG. Three of these sensitive communities are located within the boundaries of DODHF Novato. Figure 3-7 in the main text of this EIS shows the distribution of these communities throughout DODHF Novato that was determined through this survey. A list of plant species observed at the site along with others that may be present based on habitat availability is presented in Appendix F-3. Table 3 lists the vegetation commentates determined to be within DODHF Novato and in the surrounding areas, along with a description of the location of where these communities are found. Chapter 4 provides further discussion of how these communities were described.

TABLE 3
LOCATION OF VEGETATION COMMUNITIES
AT DODHF-NOVATO

Vegetation Community	Location of Community at or near DODHF Novato
<u>Nonsensitive Vegetation Communities</u>	
nonnative grassland	northwestern Rafael Village and adjacent off-site areas; ; open space areas of Capehart and Spanish Housing; off-site north of commercial area
coast live oak woodland	small areas of Rafael Village; off-site north and southwest of Rafael Village; open space areas of Capehart and Spanish Housing
eucalyptus woodland	small area in northern part of Spanish Housing
mixed native/nonnative woodland	areas within Capehart and Spanish Housing; hills east of Spanish Housing
developed/landscaped	most of Rafael Village and DODHF Novato east of Hwy. 101; most of off-site adjacent areas
<u>Sensitive Vegetation Communities</u>	
central coast live oak riparian	A combination of these communities covers riparian areas in and adjacent to Rafael Village and riparian area within and southwest of Capehart Housing
forest/central coast riparian scrub	
valley oak woodland	off-site area northwest of Rafael Village; southern area of Capehart Housing, off-site area northeast of Spanish Housing
coastal and valley freshwater marsh	off-site southeast of Capehart Housing
California bay forest	off-site northeast and southwest of Rafael Village

In addition to mapping vegetation communities, areas on and adjacent to DODHF Novato that support wetland vegetation were mapped and are presented on Figures 3-8 and 3-9 in the main text of this EIS. These wetlands include San Jose Creek adjacent to the southern boundary of Rafael Village, Pacheco Creek in and adjacent to Capehart Housing, and drainage ditches within Rafael Village, Capehart, and Spanish Housing.

3.2 Sensitive Species Habitat

The survey for sensitive species habitat at DODHF Novato focused on eight species listed as threatened, endangered, or proposed for threatened or endangered status (Table 1). Habitat for three of these species is present on DODHF Novato. These species are listed below in Table 4 accompanied by a description of where habitat areas for each species is found on the facility. Chapter 4 provides a detailed discussion of each of these species, habitat requirements, and habitat at DODHF Novato. Other sensitive species (category 2 candidate species, California species of special concern, or species

listed by the CNPS) that may inhabit DODHF Novato based on habitat availability are also presented on Table 4 and further discussed in Chapter 4.

TABLE 4
LOCATION OF SENSITIVE SPECIES HABITAT
AT DODHF-NOVATO

Common Name Scientific Name	Location of Habitat at DODHF Novato
<u>Endangered and Threatened Species</u>	
tidewater goby <i>Eucyclogobius newberryi</i>	San Jose Creek
winter-run chinook salmon <i>Oncorhynchus tshawytscha</i>	San Jose Creek
California red-legged frog <i>Rana aurora draytonii</i>	San Jose Creek; Pacheco Creek; drainage ditches in Rafael Village, Capehart and Spanish Housing; pond in Spanish Housing
<u>Other Sensitive Species</u>	
dwarf downingia <i>Downingia pusilla</i>	drainage ditches in Rafael Village, Capehart and Spanish Housing
fragrant fritillary <i>Fritillaria liliacea</i>	grasslands and open oak woodlands in Capehart Housing
Baker's navarretia <i>Navarretia leucocephala</i> ssp. <i>bakeri</i>	grasslands and open oak woodlands in Capehart Housing
Mount Tamalpais jewelflower <i>Streptanthus glandulosus</i> var. <i>pulchellus</i>	grasslands and open oak woodlands in Capehart Housing
longfin smelt <i>Spirinchus thaleichthys</i>	San Jose Creek; Pacheco Creek
foothill yellow-legged frog <i>Rana boylei</i>	San Jose Creek; Pacheco Creek
Cooper's hawk <i>Accipiter cooperi</i>	riparian areas of San Jose and Pacheco Creeks - observed in riparian area of San Jose Creek
burrowing owl <i>Athene cunicularia</i>	grasslands and open oak woodlands in Capehart Housing
California horned lark <i>Eremophila alpestris</i>	grasslands and open oak woodlands in Capehart Housing
loggerhead shrike <i>Lanius ludovicianus</i>	grasslands and open oak woodlands in Capehart Housing
pallid bat <i>Antrozous pallidus</i>	vacant buildings throughout DODHF Novato
Townsend's western big-eared bat <i>Plecotus townsendii townsendii</i>	vacant buildings throughout DODHF Novato
California mastiff bat <i>Eumops perotis californicus</i>	vacant buildings throughout DODHF Novato

4.0 DISCUSSION

This section presents a discussion of the results presented in Chapter 3. It more fully outlines habitat requirements for all of the endangered and threatened species that inhabit the region with justifications for why some of these species are unlikely to inhabit the facility while several could inhabit DODHF Novato.

4.1 Vegetation Communities

The vegetation community map presented in the 1986 Master Plan (US Navy 1986) was found to contain several errors and vegetation community names did not seem to correspond to any specific nomenclature. This is likely due to the ten years that have passed since that map was drawn and construction and demolition projects associated with Hamilton Airfield reuse. The CDFG recommends the use of *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986) for defining vegetation communities. This manual was published in 1986 and was likely not available prior to the publication of the Master Plan.

Ten vegetation communities, five of which are considered sensitive communities by the CDFG were mapped during this survey at DODHF Novato (Table 5).

TABLE 5
VEGETATION COMMUNITIES AT DODHF-NOVATO

<u>Nonsensitive Vegetation Communities</u>
nonnative grassland
coast live oak woodland
eucalyptus woodland
mixed native/nonnative woodland
developed/landscaped
<u>Sensitive Vegetation Communities</u>
central coast live oak riparian forest
central coast riparian scrub
valley oak woodland
coastal and valley freshwater marsh
California bay forest

Nonsensitive Vegetation Communities

Nonnative grasslands are found throughout DODHF Novato. This vegetation community is characterized as annual grass cover that generally produces green and flowering cover in the spring with plants dead in the summer and fall months (Holland 1986). Nonnative grasslands are often found at elevations below 3000 feet on clay soils adjacent to oak woodlands as is the case at DODHF Novato. Nonnative grasslands at DODHF Novato support many annual species including wild oats (*Avena fatua*), soft chess (*Bromus mollis*), ripgut brome (*Bromus diandrus*), red brome (*Bromus rubens*), foxtail fescue (*Festuca megalura*), broadleaf filaree (*Erodium botrys*), redstem filaree (*Erodium cicutarium*), turkey mullein (*Eremocarpus setigerus*), sweet clover (*Melilotus* spp.), and bur clover (*Medicago hispida*) (Hamilton Reuse Planning Authority 1995).

Coast live oak woodland is found within Capehart and Spanish Housing and adjacent to Rafael Village. The coast live oak (*Quercus agrifolia*) is the dominant species in this community which is found at elevations below 4000 feet and also may contain a mixture of other oaks and broad-leaved trees (Holland 1986) as is the case at DODHF Novato. Other species within this community at DODHF Novato include valley oaks (*Quercus lobata*), Oregon white oak (*Quercus garryana*), California bay (*Umbellularia californicus*), and poison oak (*Toxicodendron diversilobum*).

The following vegetation communities are not described in *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986) because they consist almost exclusively of introduced species or communities that have been influenced by humans to the extent that they do not meet the definitions of natural communities. Nonetheless, these communities can provide adequate habitat for a variety of plants and wildlife.

Eucalyptus woodland is a vegetation type that consists almost exclusively of one tree species, blue gum (*Eucalyptus globulus*). One small area of Spanish Housing supports this community which has an understory that includes species such as toyon (*Heteromeles arbutifolia*) and poison oak (*Toxicodendron diversilobum*).

Mixed native/nonnative woodland is defined here as a vegetation community that supports many native tree species within it but also contains nonnative species, landscaping species, and sometimes has an understory that is regularly maintained. This community is found in several patches within Capehart and Spanish Housing. Dominant species found in this community include native species such as coast

live oak (*Quercus agrifolia*), valley oak (*Quercus lobata*), and California bay (*Umbellularia californicus*), and nonnative species such as Monterey pine (*Pinus radiata*), maple (*Acer* spp.), date palm (*Phoenix dactylifera*), fan palm (*Washingtonia* sp.), and blue gum (*Eucalyptus globulus*).

Developed/Landscaped areas include areas that are primarily paved or completely landscaped and maintained with nonnative trees, shrubs, and grasses. This community generally provides very little habitat for native plant and animal species.

Sensitive Vegetation Communities

Several of the vegetation communities found at and adjacent to DODHF Novato are listed by the CDFG as sensitive communities including coastal and valley freshwater marsh, central coast live oak riparian forest, central coast riparian scrub, valley oak woodland, and California bay forest. Central coast live oak riparian forest, central coast riparian scrub, and valley oak woodland are found within DODHF Novato. Additionally, several areas within and adjacent to DODHF Novato would likely be considered jurisdictional wetlands under the qualifications used by the US Army Corps of Engineers (COE).

Riparian corridors and stream beds are protected by the CDFG and are important resources to most wildlife species, providing water, cover, nesting habitat, and foraging habitat. Riparian areas associated with San Jose and Pacheco Creeks support a mixture of central coast live oak riparian forest and central coast riparian scrub. Central coast live oak riparian forest is generally dominated by coast live oak (*Quercus agrifolia*) and found in canyon bottoms and floodplains from Sonoma County south to Point Conception, California (Holland 1986). Central coast riparian scrub is characterized as a scrubby streamside thicket dominated by willows (*Salix* spp.) that varies from being fairly open to nearly impenetrable and is found along most perennial and many intermittent streams between the bay area and Point Conception, California (Holland 1986). Other species associated with the riparian areas of San Jose and Pacheco Creeks include the red willow (*Salix laevigata*), yellow willow (*Salix lasiandra*), valley oak (*Quercus lobata*), California bay (*Umbellularia californicus*), white alder (*Alnus rhombifolia*), Oregon ash (*Fraxinus latifolia*), and hinds walnut (*Juglans hindsii*) (Hamilton Reuse Planning Authority 1995). The riparian area surrounding Pacheco Creek within the Capehart Housing area also supports a mixture of central coast live oak riparian forest and central coast riparian scrub.

Much of the oak woodland within the Capehart Housing area is valley oak woodland. Valley oak woodland typically occurs at elevations below 2000 feet, contains only one tree species, the valley oak (*Quercus lobata*), and forms an understory of grassland instead of a more closed woodland such as coast live oak woodland. The valley oak is California's largest broad-leaved tree and may grow to between 45 and 110 feet at maturity (Holland 1986).

Coastal and valley freshwater marsh is a vegetation community seasonally found adjacent to Capehart Housing within the railroad right-of-way and within the agricultural fields between Capehart and Spanish Housing. This community typically is dominated by tules (*Scripus* spp.) and cattails (*Typha* spp.) (Holland 1986).

California bay forest is found in two small areas adjacent to Rafael Village to the southwest and northeast. This vegetation community typically consists entirely of a dense stand of California bay (*Umbellularia californicus*) with little or no understory. Most stands of California bay forest are small and found at elevations below 3000 feet (Holland 1986).

Wetlands are a declining resource that are considered sensitive habitats by the CDFG and the USFWS. The US Congress has declared wetlands to be important to the public interest in that they perform significant biological functions, such as providing nesting, breeding, foraging, and spawning habitat for a variety of resident and migratory animal species. Wetlands also provide for the movement of water and sediments, ground water recharge, flood control, water purification, and stormwater runoff storage. No formal wetlands delineations have been performed at DODHF Novato and none were performed as a part of this survey. San Jose Creek, Pacheco Creek, and the drainage ditches on DODHF Novato would likely qualify as jurisdictional wetlands, warranting protection by the COE under Section 404 of the Clean Water Act. These areas support plant species that are considered indicator species for jurisdictional wetlands, such as cattails (*Typha* sp.) and willows (*Salix* sp.). The National Wetlands Inventory map for the area depicts San Jose Creek and Pacheco Creek as wetlands (National Wetlands Inventory 1985).

4.2 Sensitive Species Habitat

Plants

No plant species listed by the USFWS or CDFG as endangered or threatened are known or likely to inhabit the DODHF Novato because no habitat for these species is available on DODHF Novato.

Two listed species, the soft bird's-beak (*Cordylanthus mollis* ssp. *mollis*) and the Marin western flax (*Hesperolinon congestum*), may inhabit areas near DODHF Novato.

Soft bird's-beak is an annual hemiparasite in the snapdragon family. This species is restricted to salt and brackish water marshes in the northern Bay Area. These habitats are not present on DODHF Novato but are found in the northernmost parts of Hamilton Airfield about one-half mile north of DODHF Novato.

Marin western flax inhabits chaparral and valley foothill grasslands on serpentine soils. Serpentine grasslands are not known to be present on DODHF Novato. The closest known location of this species, recorded in 1992, is three miles southwest of Rafael Village (CDFG 1995a).

Sensitive plant species listed as federal category 2 species and those listed by the CNPS that have the potential to exist at DODHF Novato are presented on Table 2 in Chapter 3. Of these, four species, the dwarf downingia (*Downingia pusilla*), fragrant fritillary (*Fritillaria liliacea*), Baker's navarretia (*Navarretia leucocephala* ssp. *bakeri*), and Mount Tamalpais jewelflower (*Streptanthus glandulosus* var. *pulchellus*) are likely to be found at DODHF Novato because habitat for these species is present at the facility.

Animals

Six animal species listed as endangered or threatened were identified as potentially existing on DODHF Novato. The general habitat requirements of these species and a justification of the determination of the potential for them to inhabit DODHF Novato are discussed below.

The tidewater goby (*Eucyclogobius newberryi*) inhabits brackish and freshwater lagoons and streams where water is slow moving and aquatic vegetation is present. The tidewater goby has disappeared from about 50 percent of its historic range in California (Biosystems Books 1994). This species has not been detected in the DODHF Novato but habitat for this species exists in San Jose Creek in the eastern part of the Rafael Village area. During times of higher water, such as when this survey was conducted, the tidewater goby could access this area from the Humane Society Marsh on the east side of Highway 101. A cement structure that was even with the water line during this survey may prevent this species from moving upstream during drier parts of the year. Cement culverts under Ignacio Boulevard and rapid water flow in some areas would prevent this

species from accessing San Jose Creek throughout most of Rafael Village (Swenson 1996). However, the culvert under Highway 101 is flat and may not prevent this species from inhabiting San Jose Creek until the first culvert under Ignacio Boulevard depending on water velocity; part of this area is adjacent to Rafael Village. The closest known location of this species, recorded in 1984, is two miles north of Rafael Village (CDFG 1995a). Pacheco Creek is shallower and of a more intermittent nature than San Jose Creek and is unlikely to be able to sustain the tidewater goby. Additionally, Pacheco Creek is very disturbed in the reaches further towards the San Pablo Bay than in DODHF Novato. The creek passes under a developed area of Hamilton Airfield for a distance of about one-half mile and through an area that is almost completely cemented before reaching the bay.

The winter-run chinook salmon (*Oncorhynchus tshawytscha*) does not currently have an established migration "run" in the creeks in this area, but salmon may have historically inhabited San Jose Creek (US Navy 1987b). This species could currently exist in San Jose Creek. Chinook salmon have been recorded in the Humane Society Marsh (Hamilton Reuse Planning Authority 1995) which is where San Jose Creek drains directly on the east side of Highway 101. Although several culverts exist on San Jose Creek where it passes under Ignacio Boulevard, salmon are known to be able to spawn up barriers of greater height than those in the culverts. Only the furthest culvert in the Rafael Village area is covered by a grate that could prevent salmon from inhabiting the Creek that far upstream. Pacheco Creek is shallower and of a more intermittent nature than San Jose Creek and is unlikely to be able to sustain chinook salmon for the same reasons as were discussed above for the tidewater goby.

The California red-legged frog (*Rana aurora draytonii*) requires a permanent or semi-permanent pond or slow-moving water source with deeper pools and aquatic vegetation in which to breed. Suitable breeding habitat exists in San Jose Creek within and adjacent to Rafael Village, Pacheco Creek within Capehart Housing, and several of the drainage ditches surrounding Rafael Village, Capehart Housing, and Spanish Housing. No observations of California red-legged frogs have been recorded within DODHF Novato, but the DODHF Novato is located within the historic range of this species.

The California black rail (*Laterallus jamaicensis coturniculus*) and California clapper rail (*Rallus longirostris obsoletus*) inhabit northern coastal saltmarsh areas in the region of DODHF Novato. The closest known locations of these species, recorded in 1986 and 1975 respectively, is at the mouth of Novato Creek, about one-half mile north of Capehart Housing (CDFG 1995a). These species are

unlikely to inhabit DODHF Novato because no coastal salt marsh is present in or adjacent to DODHF Novato.

One endangered mammal species, the salt marsh harvest mouse (*Reithrodontomys raviventris*), inhabits the region of DODHF Novato. The salt marsh harvest mouse lives in tidal wetland habitats dominated by pickleweed (*Salicornia virginica*). No habitat for this species exists on DODHF Novato. The closest known location of this species, recorded in 1986, is over four miles to the south of the DODHF Novato (CDFG 1995a).

Several other sensitive species listed in Table 2 in Chapter 3 may inhabit DODHF Novato. San Jose and Pacheco Creeks and associated riparian areas may provide habitat for the longfin smelt (*Spirinchus thaleichthys*), foothill yellow-legged frog (*Rana boylei*), Cooper's hawk (*Accipiter cooperi*). Grasslands and valley oak woodlands (which have a grassland understory) may provide habitat for the burrowing owl (*Athene cunicularia*), California horned lark (*Eremophila alpestris*), and loggerhead shrike (*Lanius ludovicianus*). Vacant buildings could provide habitat for three sensitive bat species, the pallid bat (*Antrozous pallidus*), Townsend's western big-eared bat (*Plecotus townsendii townsendii*), and California mastiff bat (*Eumops perotis californicus*).

5.0 REFERENCES

- Allaback, Mark and David Laabs. 1996. Personal communication with Biosearch Wildlife Surveys.
- Biosystems Books. 1994. *Life on the Edge: A Guide to California's Endangered Natural Resources: Wildlife*. Santa Cruz, California.
- Brode, John. 1996. Personal communication with the California Department of Fish and Game.
- California Department of Fish and Game (CDFG). 1989. *Fish Species of Special Concern in California*. October 1989.
- CDFG. 1994a. *Endangered, Threatened, and Rare Plants of California*. Natural Heritage Division, Endangered Plant Program. November 1994.
- CDFG. 1994b. *Special Animals List*. August 1994.
- CDFG. 1994c. *Special Plants List*. November 1994.
- CDFG. 1995a. *California Natural Diversity Data Base*. Natural Heritage Division.
- CDFG. 1995b. *Endangered and Threatened Animals of California*. Natural Heritage Division. January 1995.
- Eschmeyer, William N. and Herald, Earl S. 1983. *A Field Guide to Pacific Coast Fishes*. Houghton Mifflin Company, Boston.
- Geer, Kellee. 1996. Personal communication with the US Fish and Wildlife Service.
- Hamilton Reuse Planning Authority. 1995. Hamilton Army Airfield Reuse Plan. October 1995.
- Hickman, James C. 1993. *The Jepson Manual: Higher Plants of California*. University of California Press, Berkeley.
- Holland, Robert F. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. Prepared for State of California, The Resources Agency, Department of Fish and Game.
- Ingles, Lloyd G. 1965. *Mammals of the Pacific States*. Stanford University Press, Stanford, California.
- McGinnis, Samuel. 1984. *Freshwater Fishes of California*. University of California Press, Berkeley.

- National Geographic Society. 1992. *Field Guide to the Birds of North America, Second Edition*.
- National Wetlands Inventory. 1985. *National Wetlands Inventory Map of the Novato Quadrangle*. Scale 1:24,000. April 1985.
- Petrides, George A. and Olivia. 1992. *Western Trees*. Peterson Field Guides.
- Skinner, Mark W. And Bruce M. Pavlik. 1994. *Inventory of Rare and Endangered Vascular Plants of California*. California Native Plant Society, Sacramento.
- Stebbins, Robert C. 1985. *Western Reptiles and Amphibians, Second Edition*. Houghton Mifflin Company, New York.
- Swenson, Ramona. 1996. Personal communication with Trihey and Associates.
- US Fish and Wildlife Service (USFWS). 1993. *Plant Taxa for Listing as Endangered or Threatened Species; Notice of Review*. 50 CFR Part 17. November 22, 1993.
- USFWS. 1994a. *Endangered and Threatened Wildlife and Plants; Animal Candidate Review for Listing as Endangered or Threatened Species; Proposed Rule*. 50 CFR Part 17. November 15, 1994.
- USFWS. 1994b. *Endangered and Threatened Wildlife and Plants*. 50 CFR 17.11& 17.12. August 20, 1994.
- USFWS. 1994c. *Listed and Proposed Endangered and Threatened Species and Candidate Species that may Occur in the area of the Proposed Closure of the Department of Defense Housing Facility, Novato, Marin County, California*. March 5, 1994.
- USFWS. 1995. *Notice of Proposed Endangered Status for Suisun Thistle and Soft Bird's Beak from Tidal Marshes in the San Francisco Bay Area of Northern California*. June 16, 1995.
- US Geological Survey. 1959. *Novato Quadrangle*. Scale 1:24,000. Photorevised 1980.
- US Navy. 1986. *Master Plan, DOD Housing Facility, Novato, California*. September 1986.
- US Navy. 1987. *Flood Control and Maintenance Plan for San Jose Creek and Pacheco Creek*. Prepared by USDA River Basin Planning Staff, Soil Conservation Service. September 1987.
- US Navy. 1988. *Fish and Wildlife Management Plan for Department of Defense Housing Facility, Novato, California*. February 1988.



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Sacramento Field Office
2800 Cottage Way, Room E-1803
Sacramento, California 95825-1846

In Reply Refer To:
1-1-94-SP-679

March 5, 1994

Mr. John H. Kennedy
Head, Environmental Planning Branch
Naval Facilities Engineering Command
900 Commodore Drive
San Bruno, California 94066-2402

Subject: Updated Species Lists for the Proposed Closure of Six San Francisco Bay Area Naval Facilities, Marin, Solano, Alameda and San Francisco Counties, California

Dear Mr. Kennedy:

The enclosed updated lists reflect an omission of the California brown pelican, *Pelecanus occidentalis californicus*, from Enclosure A-3, and the recent changes in status of some species as published in the Federal Register since our letter to you dated December 31, 1993, relating to the proposed closure of six Naval facilities (see Enclosures A-1 through A-6). These lists fulfill the requirement of the Fish and Wildlife Service (Service) to provide a species list pursuant to Section 7(c) of the Endangered Species Act, as amended (Act).

Some pertinent information concerning the distribution, life history, habitat requirements, and a discussion of the responsibilities of federal agencies under Section 7(c) of the Act were provided for those species addressed in response to your initial request for species lists. Attached is information concerning listed and proposed species not previously sent to you.

Formal consultation, pursuant to 50 CFR § 402.14, should be initiated if you determine that a listed species may be affected by the proposed project. If you determine that a proposed species may be adversely affected, you should consider requesting a conference with our office pursuant to 50 CFR § 402.10. Informal consultation may be utilized prior to a written request for formal consultation to exchange information and resolve conflicts with respect to a listed species. If a biological assessment is required, and it is not initiated within 90 days of your receipt of this letter, you should informally verify the accuracy of these lists with our office.

Also, for your consideration, we have included lists of the candidate species that may be present in the project area (see Enclosure A-1 through A-6). These species are currently being reviewed by the Service and are under consideration for possible listing as endangered or threatened. Candidate


Mr. John H. Kennedy, Head, Environmental Planning Branch

2

species have no protection under the Endangered Species Act, but are included for your consideration as it is possible that one or more of these candidates could be proposed and listed before the subject project is completed. Should the biological assessment reveal that candidate species may be adversely affected, you may wish to contact our office for technical assistance. One of the potential benefits from such technical assistance is that by exploring alternatives early in the planning process, it may be possible to avoid conflicts that could otherwise develop, should a candidate species become listed before the project is completed.

Please contact Laurie Stuart Simons of this office at (916) 978-5408 extension 330 for any questions regarding the enclosed list or your responsibilities under the Endangered Species Act. For questions concerning the threatened winter-run chinook salmon, please contact Jim Lecky, Endangered Species Coordinator, at the National Marine Fisheries Service, Southwest Region, 501 West Ocean Boulevard, Suite 4200, Long Beach California 90802-4213, or call him at (310) 980-4015.

Sincerely,



for Dale A. Pierce
Acting Field Supervisor

Enclosures

cc: NMFS, Long Beach, CA (Attn: Jim Lecky)

ENCLOSURE A-1

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES AND
CANDIDATE SPECIES THAT MAY OCCUR IN THE AREA OF THE PROPOSED
CLOSURE OF THE DEPARTMENT OF DEFENSE HOUSING FACILITY, NAVATO,
MARIN COUNTY, CALIFORNIA
(1-1-94-SP-679, MARCH 5, 1994)

Listed Species

Fish

winter-run chinook salmon, *Oncorhynchus tshawytscha* (E)
tidewater goby, *Euclyclogobius newberryi* (E)

Mammals

salt marsh harvest mouse, *Reithrodontomys raviventris* (E)

Proposed Species

Amphibians

California red-legged frog, *Rana aurora draytonii* (PE)

Candidate Species

Fish

green sturgeon, *Acipenser medirostris* (2R)
longfin smelt, *Spirinchus thaleichthys* (2)

Amphibians

foothill yellow-legged frog, *Rana boylei* (2)

Reptiles

northwestern pond turtle, *Clemmys marmorata marmorata* (2)

Birds

California horned lark, *Eremophila alpestris actia* (2)
loggerhead shrike, *Lanius ludovicianus* (2)

Mammals

Point Reyes jumping mouse, *Zapus trinotatus orarius* (2)
Point Reyes mountain beaver, *Aplodontia rufa phaea* (2)
Pacific western big-eared bat, *Plecotus townsendii townsendii* (2)
greater western mastiff-bat, *Eumops perotis californicus* (2)

Plants

northcoast bird's-beak, *Cordylanthus maritimus* ssp. *palustris* (2)
soft bird's-beak, *Cordylanthus mollis* ssp. *mollis* (1)
fragrant fritillary, *Fritillaria liliacea* (2)
Marin knotweed, *Polygonum marinense* (2)

Plant Species

This plant species list provides a inventory of species that may occur on DODHF Novato. Those that were observed during the 1996 surveys are noted with an asterisk (*).

Common Name

Bailey acacia
blackwood acacia
yarrow
California maidenhair
California buckeye
western dandelion
silver European hairgrass
pink lady
beach-bur
western ragweed
rancher's fireweed
scarlet pimpernel
pearly everlasting
mayweed
celery
coast rock cress
madrone
Dutchman's pipe
California sagebrush
mugwort
aster
aster
anthysanus
whiteleaf saltbush
Australian saltbush
spearscale
slender wild oat*
wild oat
marsh baccharis
coyote brush
winter cress
bellardia
sticktight
black mustard
field mustard
rattlesnake grass
quaking grass
harvest brodiaea
California brome
ripgut grass*
soft chess
red brome
sea rocket
water-statwort
morning glory
morning glory
sun cups

Scientific Name

Acacia baileyana
Acacia melanoxydon
Achillea millefolium
Adiantum jordanii
Aesculus californica
Agoseris grandiflora
Aira caryophylla
Amaryllis belladonna
Ambrosia chamissonis
Ambrosia psilostachya
Amsinckia menziesii var. *intermedia*
Anagallis arvensis
Anaphalis margaritacea
Anthemis cotula
Apium graveolens
Arabis blepharophylla
Arbutus menziesii
Aristolochia californica
Artemisia californica
Artemisia douglasiana
Aster chilensis
Aster radulinus
Athysanus pusillus
Atriplex leucophylla
Atriplex semibaccata
Atriplex triangularis
Avena barbata
Avena fatua
Baccharis douglasii
Baccharis pilularis
Barbarea orthoceras
Bellardia trixago
Bidens frondosa
Brassica nigra
Brassica rapa
Briza maxima
Briza minor
Brodiaea elegans
Bromus carinatus
Bromus diandrus
Bromus hordeaceus
Bromus madritensis ssp. *rubens*
Cakile maritima
Callitriche marginata
Calystegia occidentalis
Calystegia subacaulis
Camissonia ovata

Common Name

shepard's purse
toothwort
bitter-cress
cardaria
Italian thistle*
Napa thistle
sedge
sedge
iceplant
Indian paintbrush
purple owl's clover
blue blossom
yellow star-thistle*
centaury
red valerian
Mexican tea
soap plant
bush chrysanthemum
cicendia
western thistle
brownie thistle
bull thistle
farewell-to-spring
miner's lettuce
poison hemlock
Pampas grass
hazelnut
cotoneaster
brass-buttons
pygmyweed
white forget-me-not
Arizona cypress
Monterey cypress*
dodder
artichoke thistle
Bermuda grass
hound's tongue
nut sedge
California oatgrass
carrot
slender hairgrass
wild hyacinth
California dichondra
wild teasel
fairy bells
salt grass
shooting star
wood fern
bluff lettuce
veldt grass
blue wildrye
big squirreltail

Scientific Name

Capsella bursa-pastoris
Cardamine californica
Cardamine oligosperma
Cardaria diaba
Carduus pyconcephalus
Carduus tenuiflorus
Carex obnupta
Carex praegracilis
Carpobrotus edulis
Castilleja affinis
Castilleja exerta
Ceanothus thyrsiflorus
Centaurea solstitialis
Centaureum muehlenbergii
Centranthus ruber
Chenopodium ambrosioides
Chloragalum pomeridianum var. *pomeridianum*
Chrysanthemum anethifolium
Cicendia quadrangularis
Cirsium occidentale
Cirsium quercetorum
Cirsium vulgare
Clarkia rubicunda
Claytonia perfoliata
Conium maculatum
Cortaderia selloana
Corylus cornuta var. *californica*
Cotoneaster pannosa
Cotula coronopifolia
Crassula connata
Cryptantha muricata
Cupressus arizonica
Cupressus macrocarpa
Cuscuta salina
Cynara cardunculus
Cynodon dactylon
Cynoglossum grande
Cypens sp.
Danthonia californica
Daucus pusillus
Deschampsia elongata
Dichelostemma capitatum
Dichondra donnelliana
Dipsacus fullonum
Disporum hookeri
Distichlis spicata
Dodecatheon hendersonii
Dryopteris arguta
Dudleya farinosa
Ehrhata erecta
Elymus glaucus
Elymus multisetus

Common Name

willow-herb
turkey mullein
buckwheat
golden yarrow
seaside woolly sunflower
filaree
red stem filaree
broadleaf filaree
California poppy*
blue gum
petty spurge
western goldenrod
California fescue
red fescue
fennel
alkali heath
fragrant fritillary
goose grass
California bedstraw
Canary Island broom
broom
cranesbill
everlasting
everlasting
everlasting
everlasting
everlasting
marsh gum plant
California mustard
hainardia
hayfield tarweed
coast tarweed
Fitch spikeweed
common spikeweed
cow parsnip
toyon*
telegraph weed
hawkweed
mustard
oceanspray
meadow barley
foxtail barley
Mediterranean barley
common barley
smooth cat's-ear
rough cat's ear
poverty weed
Baltic rush
toad rush
Pacific rush
iris-leaved rush

Scientific Name

Epilobium brachycarpum
Eremocarpus setigerus
Eriogonum nudum
Eriophyllum confertiflorum
Eriophyllum staechadifolium
Erodium botrys
Erodium cicutarium
Erodium moschatum
Eschscholzia californica
Eucalyptus globulus
Euphorbia peplus
Euthamia occidentalis
Festuca californica
Festuca rubra
Foeniculum vulgare
Frankenia salina
Fritillaria liliacea
Galium aparine
Galium nuttallii
Genista canariensis
Genista monspessularia
Geranium dissectum
Gnaphalium californicum
Gnaphalium luteo-album
Gnaphalium purpureum
Gnaphalium ramosissimum
Gnaphalium sp.
Grindelia hirsutula var. *hirsutula*
Guillenia lasiophylla
Hainardia cylindrica
Hemizonia congesta ssp. *luzufolia*
Hemizonia corymbosa
Hemizonia fitchii
Hemizonia pungens
Heracleum lanatum
Heteromeles arbutifolia
Heterotheca grandiflora
Hieraceum albiflorum
Hirshfeldia incans
Holodiscus discolor
Hordeum brachyantherum
Hordeum jubatum
Hordeum marinum ssp. *gussoneanum*
Hordeum murinum ssp. *leporinum*
Hypochaeris glabra
Hypochaeris radicata
Iva axillaris ssp. *robustior*
Juncus balticus
Juncus bufonius
Juncus effusus
Juncus xiphioides

Common Name

prickly lettuce
Farallon weed
Pacific pea
duckweed
alkali ryegrass
woodland star
Italian ryegrass
lomatium
lomatium
bird's-foot trefoil
deerweed
trefoil
trefoil
silver lupine
yellow bush lupine
miniature lupine
lupine
lupine
lupine
lupine
arroyo lupine
loosestrife
threadstem madia
slender tarweed
coast tarweed
cheeseweed
California man-root
California bur-clover
California melic
Torrey melic
white sweet-clover
sourclover
bush monkeyflower
yellow monkeyflower
coyote mint
myoporum
forget-me-not
foothill needlegrass
purple needlegrass
skunkweed
osberry
giant oenothera
narrow-leaved owl's clover
cicely
sickle grass
knotgrass
coffee fern
bird's-foot fern
Kikuyu grass
yampah
phacelia
phacelia

Scientific Name

Lactuca serriola
Lasthenia minor
Lathyrus vestitus
Lemna gibba
Leymus triticoides
Lithophragma affinie
Lolium multiflorum
Lomatium californicum
Lomatium dasycarpum
Lotus corniculatus
Lotus scoparius
Lotus sp.
Lotus wrangelianus
Lupinus albifrons
Lupinus arboreus
Lupinus bicolor
Lupinus formosus
Lupinus latifolius
Lupinus microcarpus
Lupinus nanus
Lupinus succulentus
Lythrum hyssopifolium
Madia exigua
Madia gracilis
Madia sativa
Malva parviflora
Marah fabaceus
Medicago polymorpha
Melica californica
Melica torreyana
Melilotus alba
Melilotus indica
Mimulus aurantiacus
Mimulus guttatus
Monardella villosa
Myoporum laetum
Myosotis sylvatica
Nassella lepida
Nassella pulchia
Navarretia squarrosa
Oemleria cerasiformis
Oenothera data
Orthocarpus attenuatus
Osmorhiza chilensis
Parapholis incurva
Paspalum distichum
Pellaea andromedfolia
Pellaea mucronata
Pennisetum clandestinum
Perideridia gairdneri
Phacelia californica
Phacelia distans

Common Name

bristly ox-tongue
Coulter pine
bishop pine
Monterey pine*
rein orchid
smilo grass
popcorn flower
California plantain
English plantain
common plantain
annual bluegrass
one-sided bluegrass
four-leaved allseed
common knotweed
California polypody
annual beardgrass
sword fern
cinquefoil
bitter cherry
woolly-heads
bracken fern
firethorn
coast live oak*
Oregon white oak*
valley oak*
buttercup
wild radish
California coffeeberry
hillside gooseberry
red-flowering currant
California rose
wood rose
Himalaya berry
California blackberry*
sheep sorrel
curly dock
willow dock
pickleweed
red willow
arroyo willow*
shining willow
blue elderberry
purple sanicle
sanicle
yerba buena
bullrush
sedge
California figwort
butterweed
German-ivy
groundsel
ragwort

Scientific Name

Picris echioides
Pinus coulteri
Pinus muricata
Pinus radiata
Piperia unalascensis
Piptantherum miliaceum
Plagiobothrys nothofulvus
Plantago erecta
Plantago lanceolata
Plantago major
Poa annua
Poa secunda ssp. *secunda*
Polycarpon tetraphyllum
Polygonum arenastrum
Polypodium californicum
Polypogon monspeliensis
Polystichum munitum
Potentilla glandulosa
Prunus emarginata
Psilocarphus tenellus
Pteridium aquilinum
Pyracantha angustifolia
Quercus agrifolia
Quercus garryana
Quercus lobata
Ranunculus californica
Raphanus sativus
Rhamnus californica
Ribes californicum
Ribes sanguineum
Rosa californica
Rosa gymnocarpa
Rubus discolor
Rubus ursinus
Rumex acetosella
Rumex crispus
Rumex salicifolius
Salicornia virginica
Salix laevigata
Salix lasiolepis
Salix lucida ssp. *lasiandra*
Sambucus mexicana
Sanicula bipinnatifida
Sanicula crassicaulis
Satureja douglasii
Scirpus acutus var. *occidentalis*
Scirpus olneyi
Scrophularia californica
Senecio aronicoides
Senecio mikanoides
Senecio sylvaticus
Senecio vulgaris

Common Name

coast redwood
checker mallow
catchfly
milk thistle
charlock
hedge mustard
blue-eyed grass
nightshade
nightshade
California goldenrod
prickly sow-thistle
common sow-thistle
Johnsongrass
California cord-grass
stickwort
sand-spurrey
hedgenettle
common chickweed
snowberry
creeping snowberry
dandelion
New Zealand spinach
meadow-rue
poison oak*
puncture vine
star flower
red clover
white clover
tomcat clover
seaside arrow-grass
giant trillium
small owl's clover
Ithuriel's spear
cattail*
California bay*
verbena
common vetch
giant vetch
Johnny-jump-up
vulpia
vulpia
vulpia
vulpia
giant chain fern
narrow-leaved mule ears

Scientific Name

Sequoia sempervirens
Sidalcea malvaeflora
Silene gallica
Silybum marianum
Sinapsis arvensis
Sisymbrium officinale
Sisyrinchium bellum
Solanum furcatum
Solanum umbelliferum
Solidago californica
Sonchus asper ssp. *asper*
Sonchus oleraceus
Sorghum halapense
Spartina foliosa
Spergula arvensis ssp. *arvensis*
Spergularia macrotheca
Stachys ajugoides var. *rigida*
Stellaria media
Symphoricarpos albus var. *laevigatus*
Symphoricarpos mollis
Taraxacum officinale
Tetragonia expansa
Thalictrum fendleri var. *polycarpum*
Toxicodendron diversilobum
Tribulus terrestris
Trientalis latifolia
Trifolium pratense
Trifolium repens
Trifolium willdenovii
Triglochin maritima
Trillium chloropetalum
Triphysania pusillus
Triteleia laxa
Typha latifolia
Umbellularia californica
Verbena lasiostachys
Vicia americana
Vicia gigantea
Viola pedunculata
Vulpia bromoides
Vulpia microstachys var. *microstachys*
Vulpia myuros var. *hirsuta*
Vulpia myuros var. *myuros*
Woodwardia fimbriata
Wyethia angustifolia

Animal Species

This animal species list provides a inventory of species that may occur on DODHF Novato. Those that were observed during the 1996 surveys are noted with an asterisk (*).

Common Name

Scientific Name

Fish

topsmelt	<i>Atherinops affinis</i>
Pacific herring	<i>Clupea pallasii</i>
sculpin	<i>Cottus</i> sp.
threadfin shad	<i>Dorosoma petenense</i>
tidewater goby	<i>Eucyclogobius newberryi</i>
threespine stickleback	<i>Gasterosteus aculeatus</i>
California roach	<i>Hesperoleucus symmetricus</i>
striped bass	<i>Morone saxitalis</i>
chinook salmon	<i>Oncorhynchus tshawytscha</i>
starry flounder	<i>Platyichthys stellatus</i>
steelhead trout	<i>Salmo gairdneri</i>

Amphibians

arboreal salamander	<i>Aneides lugubris</i>
slender salamander	<i>Batrachoseps attenuatus</i>
western toad	<i>Bufo boreas</i>
ensatina	<i>Ensatina eschscholtzi</i>
Pacific chorus frog*	<i>Hyla regilla</i>
California red-legged frog	<i>Rana aurora draytonii</i>
foothill yellow-legged frog	<i>Rana boylei</i>
bullfrog	<i>Rana catesbeiana</i>
California newt	<i>Taricha torosa</i>

Reptiles

racer	<i>Coluber constrictor</i>
sharp-tailed snake	<i>Contia tenuis</i>
western rattlesnake	<i>Crotalus viridis</i>
ring-necked snake	<i>Diadophis punctatus</i>
western skink	<i>Eumeces skiltonianus</i>
northern alligator lizard	<i>Gerrhonotus coeruleus</i>
southern alligator lizard	<i>Gerrhonotus multicarinatus</i>
common kingsnake	<i>Lampropeltis getulus</i>
gopher snake	<i>Pituophis melanoleucus</i>
western fence lizard	<i>Sceloporus occidentalis</i>
aquatic garter snake	<i>Thamnophis couchi</i>
terrestrial garter snake	<i>Thamnophis elegans</i>

Birds

Cooper's hawk*	<i>Accipiter cooperi</i>
sharp-shinned hawk	<i>Accipiter striatus</i>
white-throated swift	<i>Aeronautes saxatilis</i>
red-winged blackbird*	<i>Agelaius phoeniceus</i>
grasshopper sparrow	<i>Ammodramus savannarum</i>
scrub jay*	<i>Aphelocoma coerulescens</i>
great blue heron*	<i>Ardea herodias</i>

Common Name

short-eared owl
cedar waxwing
Canada goose
great horned owl
red-tailed hawk*
red-shouldered hawk
California quail*
Anna's hummingbird
pine siskin
lesser goldfinch
American goldfinch
house finch*
purple finch
great egret
turkey vulture*
hermit thrush
Swainson's thrush
brown creeper
wrentit
killdeer
Vaux's swift
lark sparrow
northern harrier
marsh wren
northern flicker*
band-tailed pigeon
rock dove*
western wood pewee
American crow*
common raven*
yellow-rumped warbler
black-throated gray warbler
hermit warbler
yellow warbler
Townsend's warbler
snowy egret
black-shouldered kite*
western flycatcher
horned lark
Brewer's blackbird*
merlin
prairie falcon
American kestrel
saltmarsh common yellowthroat
cliff swallow
barn swallow
Bullock's oriole
dark-eyed junco*
loggerhead shrike
belted kingfisher*
acorn woodpecker*
Lincoln's sparrow

Scientific Name

Asio flammeus
Bombycilla cedrorum
Branta canadensis
Bubo virginiana
Buteo jamaicensis
Buteo lineatus
Callipepla californica
Calypte anna
Carduelis pinus
Carduelis psaltria
Carduelis tristis
Carpodacus mexicanus
Carpodacus purpureus
Casmerodius albus
Cathartes aura
Catharus guttatus
Catharus ustulatus
Certhia familiaris
Chamaea fasciata
Charadrius vociferus
Cheatura vauxi
Chondestes grammacus
Circus cyaneus
Cistothorus palustris
Colaptes auratus
Columba fasciata
Columba livia
Contopus sordidulus
Corvus brachyrhynchos
Corvus corax
Dendroica coronata
Dendroica nigrescens
Dendroica occidentalis
Dendroica petechia
Dendroica townsendi
Egretta thula
Elanus caeruleus
Empidonax difficilis
Eremophila alpestris
Euphagus cyanocephalus
Falco columbarius
Falco mexicanus
Falco sparverius
Geothlypis trichas
Hirundo pyrrhonota
Hirundo rustica
Icterus galbula
Junco hyemalis
Lanius ludovicianus
Megasceryle alcyon
Melanerpes formicivorus
Melospiza lincolnii

Common Name

song sparrow
northern mockingbird*
brown-headed cowbird
ash-throated flycatcher
long-billed curlew
MacGillivray's warbler
western screech owl
plain titmouse
chestnut-backed chickadee
house sparrow*
savannah sparrow
fox sparrow
Lazuli bunting
double-crested cormorant
ring-necked pheasant
black-headed grosbeak
downy woodpecker*
hairy woodpecker
rufous-sided towhee*
brown towhee
sora
bushtit*
ruby-crowned kinglet
golden-crowned kinglet
black phoebe*
rufous hummingbird
Allen's hummingbird
western bluebird*
red-breasted nuthatch
white-breasted nuthatch
red-breasted sapsucker*
American goldfinch
western meadowlark*
European starling*
tree swallow
violet-green swallow
Bewick's wren
California thrasher
greater yellowlegs
house wren
American robin*
barn owl
orange-crowned warbler
Nashville warbler
warbling vireo
Hutton's vireo
solitary vireo
Wilson's warbler
mourning dove*
gold-crowned sparrow
white-crowned sparrow*

Scientific Name

Melospiza melodia
Mimus polyglottos
Molothrus ater
Myiarchus cinerascens
Numenius americanus
Oporonis tolmiei
Otus kennicotti
Parus inornatus
Parus rufescens
Passer domesticus
Passerculus sandwichensis
Passerella iliaca
Passerina amoena
Phalacrocorax auritis
Phasianus colchicus
Pheucticus melanocephalus
Picoides pubescens
Picoides villosus
Pipilo erythrophthalmus
Pipilo fuscus
Porzana carolina
Psaltiriparus minimus
Regulus calendula
Regulus satrapa
Sayornis nigricans
Selasphorus rufus
Selasphorus sasin
Sialia mexicana
Sitta canadensis
Sitta carolinensis
Sphyrapicus ruber
Spinus tristis
Sturnella neglecta
Sturnus vulgaris
Tachycineta bicolor
Tachycineta thalassina
Thryomanes bewickii
Toxostoma redivivum
Tringa melanoleuca
Troglodytes aedin
Turdus migratorius
Tyto alba
Vermivora celata
Vermivora ruficapilla
Vireo gilvus
Vireo huttoni
Vireo solitarius
Wilsonia pusilla
Zenaidura macroura
Zonotrichia atricapilla
Zonotrichia leucophrys

Common NameMammals

pallid bat
feral dog
coyote*
opossum*
western mastiff bat
feral cat*
black-tailed hare*
striped skunk
California vole
house mouse
long-tailed weasel
dusky-footed woodrat
mule deer*
deer mouse
Townsend's western big-eared bat
raccoon*
Norway rat
black rat
western harvest mouse
California mole
western gray squirrel
California ground squirrel*
spotted skunk
brush rabbit
Mexican free-tailed bat
Botta's pocket gopher
gray fox*
red fox*

Scientific Name

Antrozous pallidus
Canis familiaris
Canis latrans
Didelphis marsupialis
Eumops perotis
Felis domesticus
Lepus californicus
Mephitis mephitis
Microtus californicus
Mus musculus
Mustela frenata
Neotoma fuscipes
Odocoileus hemionus
Peromyscus maniculatus
Plecotus townsendii townsendii
Procyon lotor
Rattus norvegicus
Rattus rattus
Reithrodontomys megalotis
Scapanus latimanus
Sciurus griseus
Spermophilus beechyi
Spilogale putorius
Sylvilagus bachmanii
Tadarida brasiliensis
Thomomys bottae
Urocyon cinereoargenteus
Vulpes vulpes

**Final
CALIFORNIA RED-LEGGED FROG
SPRING AND SUMMER SURVEYS
for
Department of Defense Housing Facility
Novato, California**

**U.S. Navy Prime Contract #62474-94-D-7555
Delivery Order #001**

August 1996

Prepared for:

**U.S. Navy, Engineering Field Activity West
900 Commodore Drive
San Bruno, CA 94066**

Prepared by:

**Tetra Tech, Inc.
180 Howard Street, Suite 250
San Francisco, CA 94105-1617
(415) 974-1221**

and

**3746 Mt. Diablo Boulevard, Suite 300
Lafayette, CA 94549-3771
(510) 283-3771**

**Karen Swaim
Swaim Biological Consulting
1285 Winding Stream Court
Livermore, CA 94116
(510) 455-8770**

TABLE OF CONTENTS

Section	Page
1.0 Purpose and Summary of Findings	36
2.0 Background Information	36
2.1 Site Description	36
2.2 Species Status	36
2.3 Ecology	39
3.0 Survey Methods	39
4.0 Results and Discussion	42
4.1 Species Observed	42
4.2 Potential Habitat	43
4.3 Conclusion	44
5.0 References Cited	45
5.1 Bibliography	45
5.2 Personal Communication	45
6.0 List of Preparers and Acknowledgment	46

LIST OF FIGURES

Figure	Page
1 Regional Location Map	37
2 DODHF Novato Planning Areas	38
3 Rafael Village Survey Areas and Wetlands	40
4 Main Site Survey Areas and Wetlands	41

1. PURPOSE AND SUMMARY OF FINDINGS

This report provides information on the legal status and ecology of the California red-legged frog, identifies areas of potential habitat at the Department of Defense Housing Facility (DODHF) in Novato, California, and presents the methods and results of the spring and summer red-legged frog surveys conducted at DODHF Novato.

The purpose of the red-legged frog surveys was to identify areas of potential habitat for and assess the presence of the California red-legged frog (*Rana aurora draytonii*) at DODHF Novato. The survey was requested by the U.S. Navy to support an environmental impact statement (EIS) being prepared to evaluate the disposal of the facility by the Navy and reuse by the local community. Surveys were conducted by Swaim Biological Consulting.

Although suitable habitat is present at DODHF Novato, no California red-legged frogs were observed at the site during the spring surveys conducted April 10, 22, and 29, 1996, or during the summer surveys conducted on June 9 and July 24, 1996.

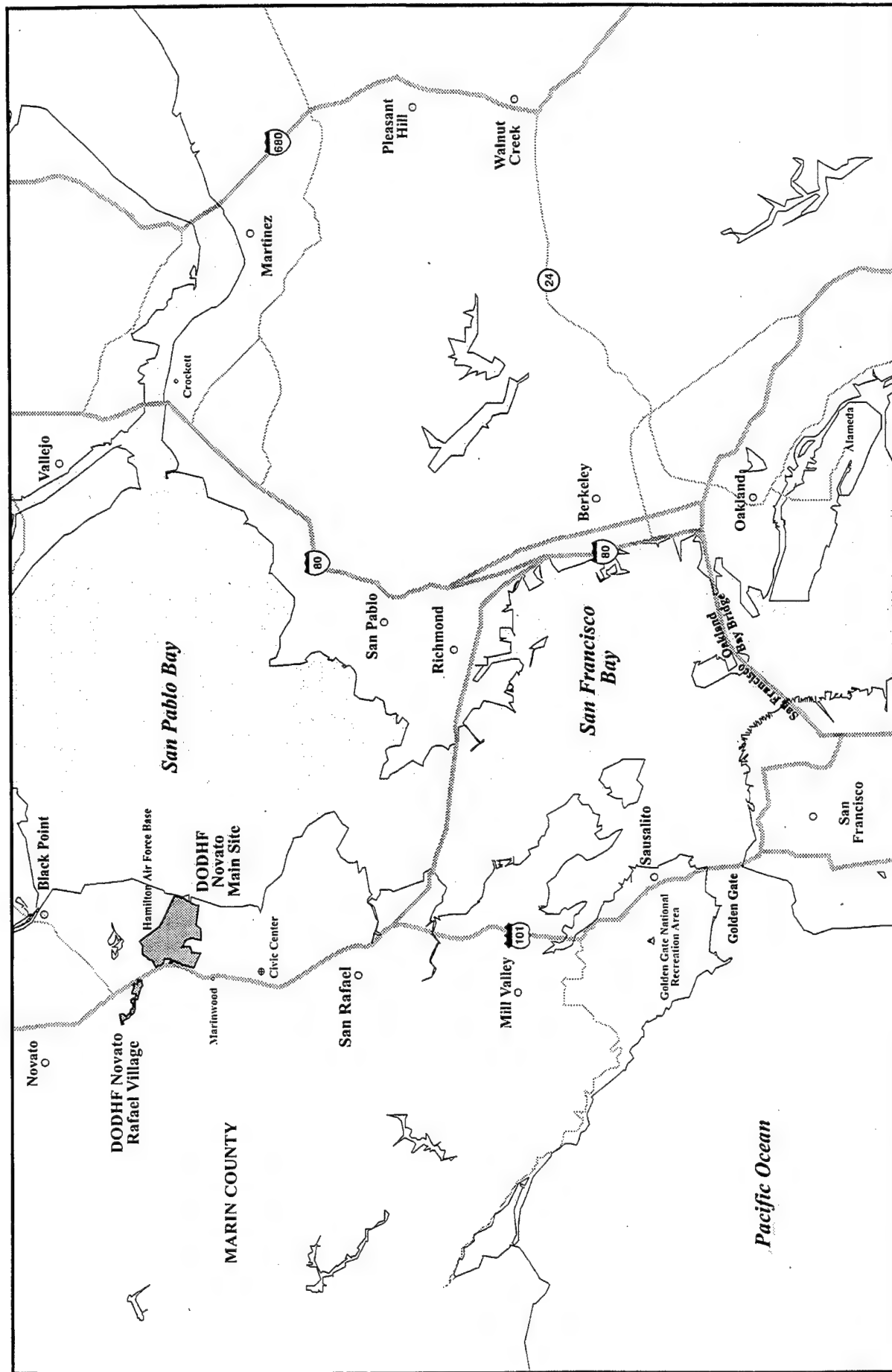
2. BACKGROUND INFORMATION

2.1 SITE DESCRIPTION

DODHF Novato is located in the southeast portion of the City of Novato, in eastern Marin County, California, approximately 20 miles north of San Francisco (Figure 1). The 481-acre facility consists of two separate areas, including the 98-acre Rafael Village on the west side of Highway 101 and Capehart and Spanish Housing at the 383-acre Main Site on the east side of Highway 101 (Figure 2).

2.2 SPECIES STATUS

At the time the surveys were initiated in early April, 1996, the red-legged frog was a species proposed for federal listing as endangered and was recognized by the state of California as a Species of Special Concern. On May 20, 1996, the U. S. Fish and Wildlife Service (USFWS) announced that the California red-legged frog would be listed as a threatened species. The effective date of this listing action was June 24, 1996 (U.S. Department of the Interior 1996).

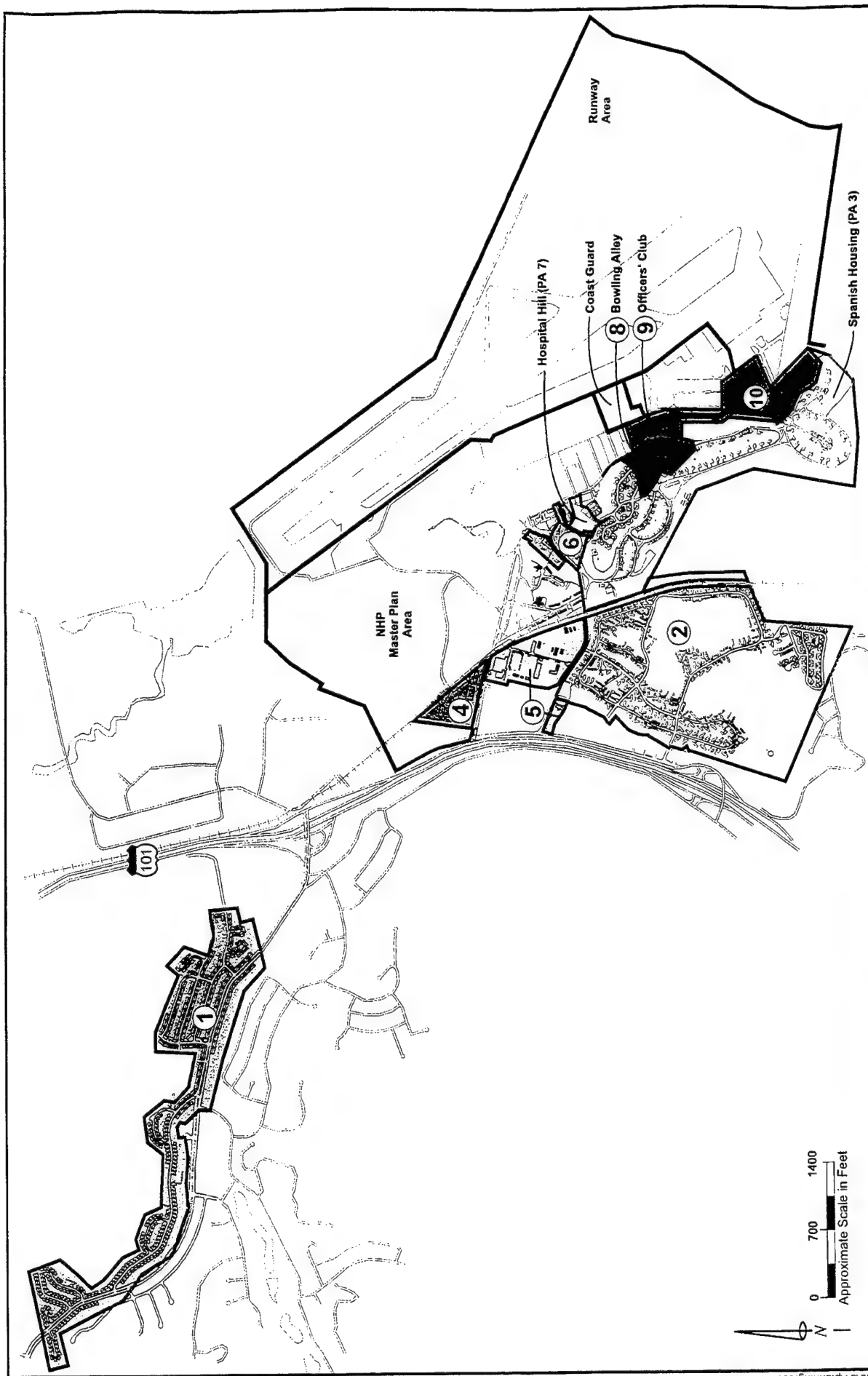


The DOD Housing Facility Novato is located approximately 20 miles north of San Francisco.

Regional Location Map
DODHF Novato Red-legged Frog Surveys
Novato, California

Figure 1

Source: Developed by Tetra Tech 1996



DODHF Novato Planning Areas

DOD HHousing Facility
Novato, California

Figure 2

The Hamilton Army Airfield Reuse Plan divides the former base into 10 planning areas. Nine Navy-owned areas and one Army-owned planning area comprise the project site. Only wetland areas were evaluated for the red-legged frog surveys.

Source: Hamilton Reuse Planning Authority 1995

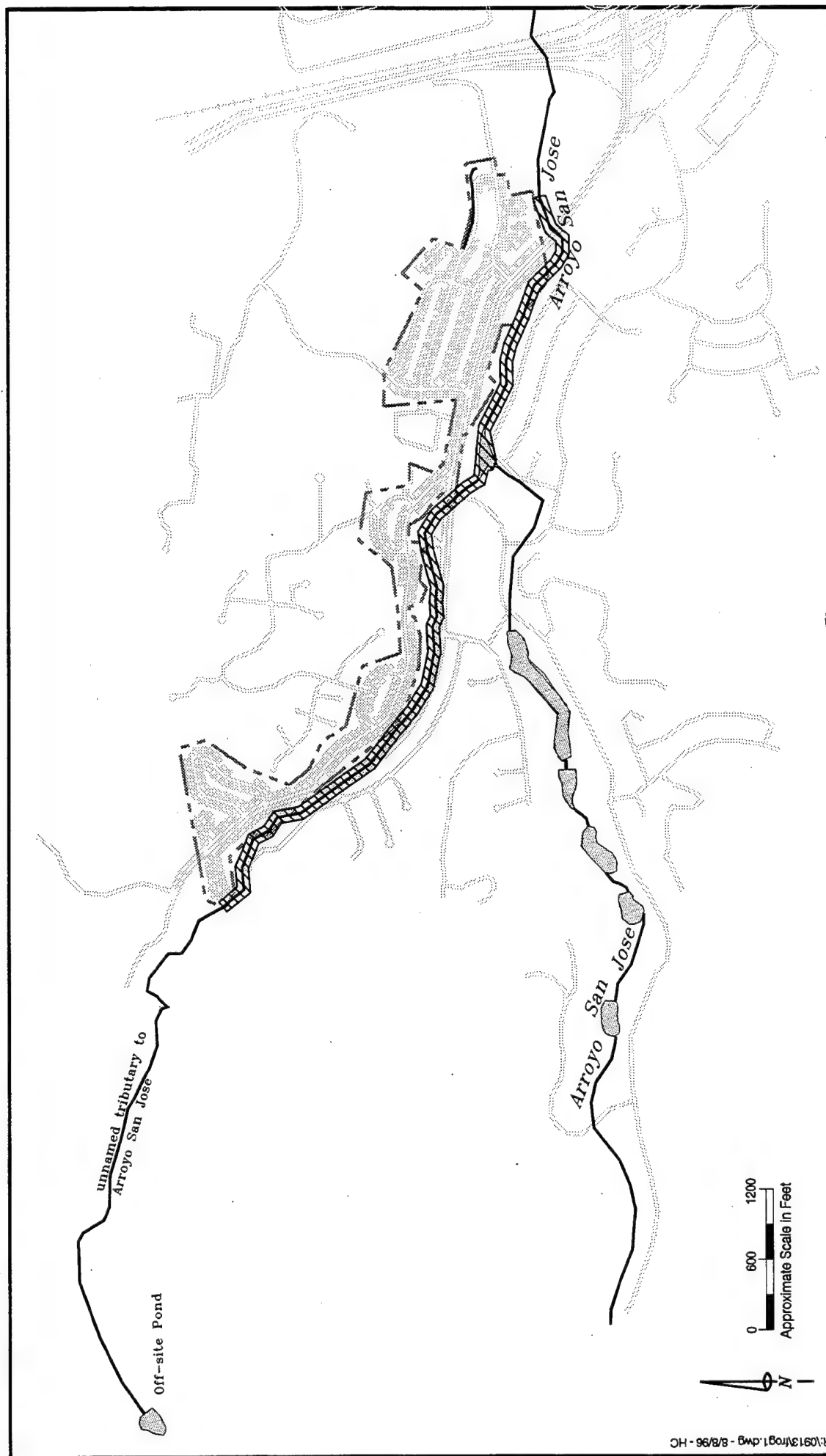
2.3 ECOLOGY

The California red-legged frog was historically found in Pacific slope drainages from near Redding (inland) and Point Reyes (coastal), southward into northern Baja California (Jennings and Hayes 1994). Museum records indicate the presence of the California red-legged frog in east central Marin County (Jennings and Hayes 1994), the same region as the project site. A recent observation (1994) of the frog was recorded at Miller Creek, which is approximately three miles south of San Rafael Village, and parallel to San Jose Creek (K. Geer, personal communication, August 1996).

The California red-legged frog is found in certain types of wetlands, such as creeks, ponds, marshes, and riparian habitats with permanent or near-permanent water (Stebbins 1985). Intermittent creeks, where some surface pooling remains all year, also provide suitable habitat. Red-legged frogs generally are associated with water bodies with extensive vegetation (e.g., willows, cattails, tules) adjacent to or overhanging the edge of the water. The frogs prefer areas with pools deeper than three feet (Jennings and Hayes 1994). Riparian vegetation and undercut stream banks with exposed roots provide concealment. Adult red-legged frogs are active primarily at night and breed in ponds within creeks or intermittent drainages, and marshes during late winter and early spring (Jennings and Hayes 1994). Females typically attach a cluster of eggs to vegetation just below the surface of the water. Eggs hatch in approximately one week. Larvae metamorphose into juvenile frogs after approximately four months. Juvenile red-legged frogs are active day and night.





3. SURVEY METHODS

All wetland areas at DODHF Novato were identified during previous studies (Buescher Biological Consulting 1996). On April 10, 1996 the suitability of each of the wetlands to provide habitat for the red-legged frog was assessed. All wetlands that provide potential habitat for the red-legged frog were surveyed by Karen Swaim and David Muth on April 10, 22, 29, June 9, and July 24, 1996. Specific survey areas identified during spring surveys (April) as having potential to support red-legged frogs included Arroyo San Jose in the Rafael Village planning area, an unnamed tributary to Arroyo San Jose, Pacheco Creek along the west side of the Capehart Housing area, the northwest corner of a wetland in the southeast corner of the Capehart Housing area, and the ditches, canals, and associated wetlands that run along the western, southern, and eastern boundaries of the Spanish Housing area (Figures 3 and 4).



Surveys for red-legged frogs were conducted along Arroyo San Jose and an unnamed tributary to Arroyo San Jose adjacent to the Rafael Village planning area.

LEGEND:

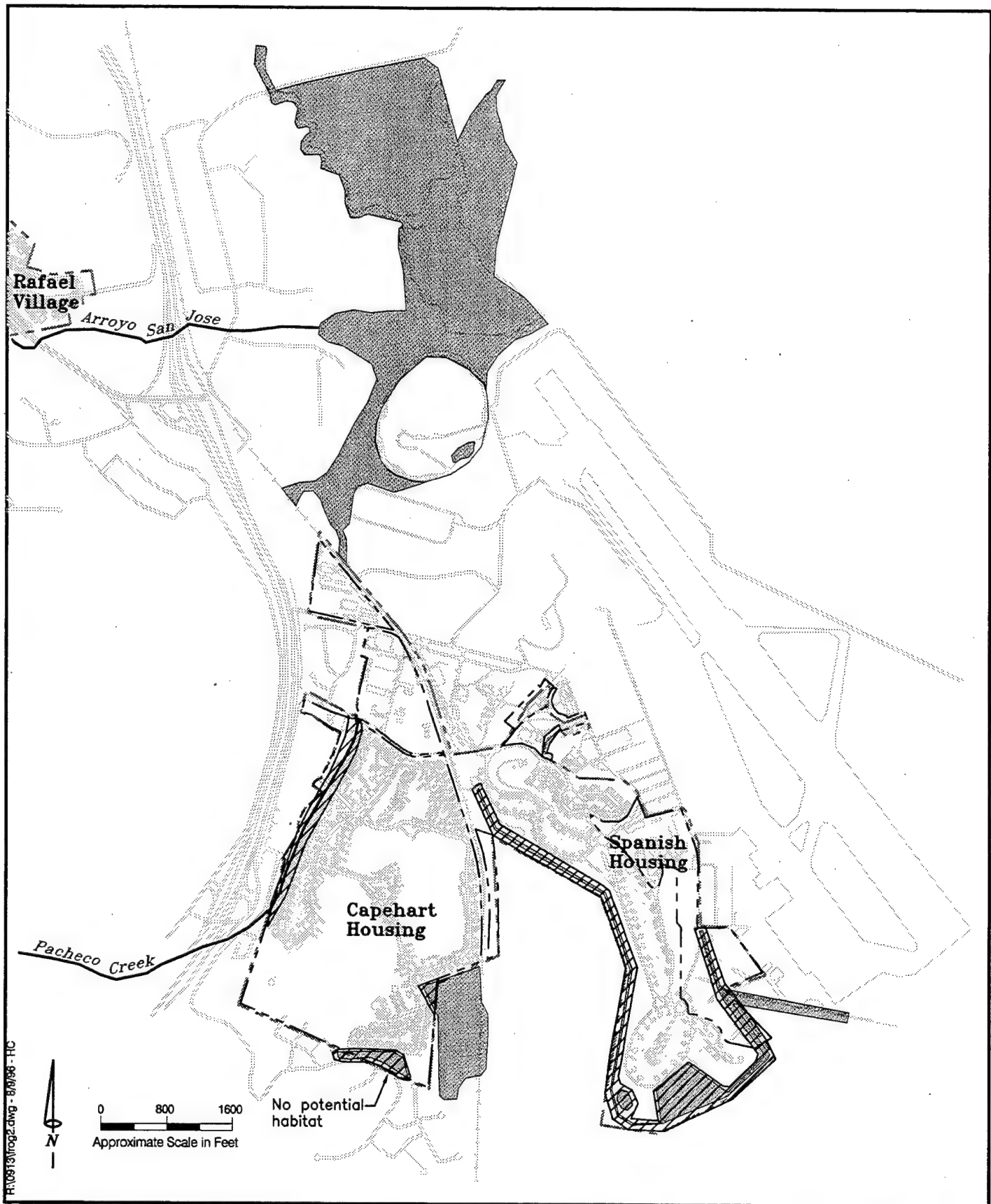
-  Area surveyed
-  Wetlands
-  Creek
-  DODHF boundary

Rafael Village Survey Areas and Wetlands

DODHF Novato Red-legged Frog Surveys
Novato, California

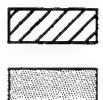
Figure 3

Source: National Wetlands Inventory 1985; Buescher Biological Consulting 1996



Surveys for red-legged frogs and their habitat were conducted at the Main Site along Pacheco Creek on the west side of the Capehart Housing area, wetlands in the southeast corner of the Capehart Housing area, and the ditches, canals, and associated wetlands surrounding the Spanish Housing area.

LEGEND:



Area surveyed

Wetlands

----- DODHF boundary

Main Site Survey Areas and Wetlands

DODHF Novato Red-legged frog Surveys
Novato, California

Source: National Wetlands Inventory 1985; Buescher Biological Consulting 1996

Figure 4

Vegetation along the unnamed tributary to Arroyo San Jose, upper portions of Arroyo San Jose, and Pacheco Creek consists of a generally closed canopy overstory dominated by coast live oak (*Quercus agrifolia*), valley oak (*Quercus lobata*), and California bay laurel (*Umbellularia californica*), with scattered box elder (*Acer negundo*) and willow (*Salix* sp.). The overstory in the lower stretch of San Jose Creek is dominated by white alder (*Alnus rhombifolia*) and willows. A small stretch of the lower portion of Arroyo San Jose is cement-lined (approximately 50 meters). This area is more open, and cattail (*Typha* sp.) is the dominant plant. The understory in both creeks is dominated by Himalaya berry (*Rubus discolor*). Cattails form a dense cover in portions of the ditches, canals, and associated wetlands that run along the western, southern, and eastern boundaries of the Spanish Housing area.

One wetland, located in the southern portion of the Capehart Housing area, was immediately eliminated from consideration as potential habitat for the red-legged frog due to a lack of standing water and the fact that the wetland was isolated from any other potential red-legged frog habitat.

Daytime and nighttime surveys were conducted on each survey date. Daytime surveys consisted of walking the length of creeks and canals and the perimeter of all other potential red-legged frog habitat within the DODHF Novato boundaries. All potential habitat was inspected for egg masses, juveniles, and adult red-legged frogs. In June, all deep pools in the creeks, canals, and wetlands at Capehart and Spanish Housing were sampled with a long handled dip net and seined with a 10x4-foot minnow seine in an effort to detect red-legged frog tadpoles. On July 24, only daytime and nighttime visual surveys without sampling were conducted. No aquatic sampling was performed during the July 24 survey due to the change in the frogs' legal status under the Endangered Species Act.

Nighttime surveys consisted of searching all potential habitat with flashlights, looking for eye shine and listening for red-legged frog vocalizations. When eye shine was detected, the animal was first viewed with binoculars and, if needed, closely approached to make a positive identification.

4. RESULTS AND DISCUSSION

4.1 SPECIES OBSERVED

Although physically suitable habitat is present, no California red-legged frogs were observed on DODHF Novato. During the spring survey, one native anuran, the Pacific chorus frog (*Pseudacris regilla*), was observed or heard calling

in all survey areas. In the summer surveys, both the Pacific chorus frog and the rough-skinned newt (*Taricha granulosa*) were observed in the study area. Chorus frog tadpoles were found in low numbers in a few pools in Arroyo San Jose and its tributary but were abundant in the wetland and canal habitats during the spring and summer surveys. Rough-skinned newts were found in the upper reaches of the Arroyo San Jose tributary in low numbers. Larvae, juveniles, and adults of the newt were observed. Native fish species observed in Pacheco Creek include three-spine stickleback (*Gastrosteus aculeatus*) and sculpin (*Cottus* spp.). Native crayfish (*Pasfastacus* sp.) were observed in Pacheco Creek.

Several species that may negatively impact the red-legged frog and reduce the habitat value for the species were observed in one or more of the potential habitat areas. Bullfrog (*Rana catesbeiana*) were observed in the portion of the canal along the eastern border of the Spanish Housing. Mosquito fish (*Gambusia affinis*) were observed in all aquatic habitats. Bluegill (*Lepomis macrochirus*) were observed in the upper reaches of the Arroyo San Jose feeder drainage. Introduced crayfish (*Procambarus* sp.) were abundant in the canals.

4.2 POTENTIAL HABITAT

Specific survey areas identified in spring as having potential to support red-legged frogs include Arroyo San Jose, its tributary, Pacheco Creek, the northwest corner of a wetland in the southeast corner of the Capehart Housing area, and the ditches, canals, and associated wetlands located along the western, southern, and eastern boundaries of the Spanish Housing area (Figures 3 and 4). During the summer surveys (June, July) the wetland in the southeast corner of the Capehart Housing area, which is a small portion of a larger wetland, was eliminated from consideration as potential habitat, since it did not hold water long enough to support red-legged frogs. Most of the wetland was dry during the June 9 survey, and only a small puddle a few inches deep remained at the outflow of a culvert that drains runoff from the Capehart Housing area. Also, this wetland is isolated from other wetlands on the site.

Several pools in Arroyo San Jose, its tributary, and Pacheco Creek appear to be permanent. Many pools are deeper than three feet, with undercut banks and exposed roots, and provide suitable habitat for California red-legged frogs. The sections of Arroyo San Jose, its tributary, and Pacheco Creek within DODHF Novato provide marginal breeding habitat for the red-legged frog due to the lack of still or ponded water and the high flow rate of the creeks during the frogs' breeding period. In addition, most of the channels of Arroyo San Jose, its tributary, and Pacheco Creek are scoured and devoid of vegetation. The tributary to Arroyo San Jose is intermittent, and, as a result, long stretches of the creek bed were dry during the June and July surveys.

One pond that may provide suitable breeding habitat is present in the tributary to Arroyo San Jose upstream from DODHF Novato, as indicated on the Novato Quadrange (USGS 7.5-minute series) and in as an off-site pond Figure 3. If red-legged frogs are present and breeding at the off-site pond, there would be potential for use by post-metamorphic red-legged frogs of the portions of the drainage into Arroyo San Jose that are inside the survey area. However, this potential is minimized by the distance of over one mile between the pond and the section of the creek within the survey area.

Another factor that may reduce the potential for use by the red-legged frog is that both creeks in the study area lie entirely within a narrow band of riparian habitat with residential developments (both DODHF and private) on both sides. In several areas, apartment complex parking lots are less than 20 feet from the top bank of the creeks. Runoff from local streets and parking lots may reduce water quality.

The deeper cattail-lined portions of the canal east of the Spanish Housing area provide physically suitable breeding habitat, but the potential for the frogs' presence is reduced by the large number of nonnative predators (i.e., crayfish, mosquito fish, and bullfrogs). The area of suitable breeding habitat within these canals is at sea level and is probably reclaimed bay land where freshwater habitats developed after levee construction.

4.3 CONCLUSION

Based on the results of spring and summer surveys, the presence of several exotic species in the suitable aquatic habitats, and the presence of only marginal breeding habitat in San Jose Creek and Pacheco Creek, it is unlikely that the California red-legged frog inhabits the areas surveyed at DODHF Novato.

5. REFERENCES CITED

5.1 BIBLIOGRAPHY

Buescher Biological Consulting. 1996. Biological Survey, DODHF Novato. February 1996. 33 pp.

Jennings, M.R. and M.P. Hayes. 1994. *Amphibian and Reptile Species of Special Concern in California*. Final report submitted to the California Department of Fish and Game, Inland Fisheries Division (Contract 8023). 255pp.

National Wetlands Inventory. 1985. National Wetlands Inventory Map of the Novato Quadrangle. Scale 1:24,000. April 1985.

Stebbins, R. C. 1985. *A Field Guide to Western Reptiles and Amphibians*. Second edition, revised. Houghton Mifflin Book Co., Boston. 336pp.

U.S. Department of the Interior. 1996. Federal Register 61(101) 25814-25833.

U.S. Navy. Unpublished. Draft Environmental Impact Statement for the Disposal and Reuse of the Department of Defense Housing Facility Novato, California.

5.2 PERSONAL COMMUNICATION

Geer, Kelley. August 6, 1996. United States Fish and Wildlife Service.

6. LIST OF PREPARERS AND ACKNOWLEDGMENT

Karen Swaim
Swaim Biological Consulting
Livermore, CA

Jane Steven
Tetra Tech, Inc.
San Francisco, CA

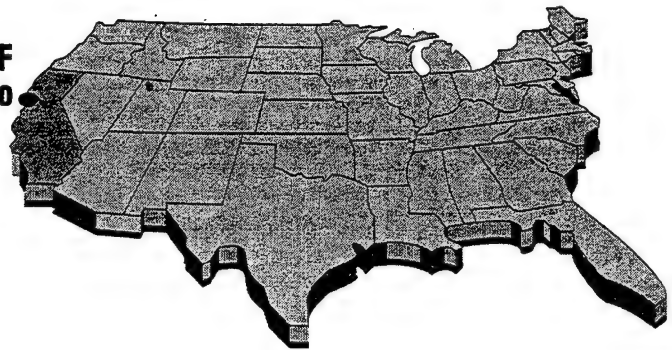
Theodore Donn, Ph.D.
Tetra Tech, Inc.
Layfayette, CA

Rosalyn Johnson
Tetra Tech, Inc.
San Francisco, CA

Acknowledgment

David Muth provided field assistance for the surveys and technical assistance for the report.

**DODHF
Novato**



APPENDIX G

TRAFFIC AND CIRCULATION

LEVEL OF SERVICE CRITERIA FOR BASIC FREEWAY SECTIONS	G-1
LEVEL OF SERVICE CRITERIA FOR INTERSECTIONS	G-2
JUNE 1995 PEAK HOUR LOS FOR KEY SEGMENTS OF REGIONAL FREEWAYS	G-3
FUNCTIONAL ROUTE CLASSIFICATION	G-4
DODHF NOVATO INTERSECTIONS IDENTIFICATION	G-5
EXISTING INTERSECTION OPERATIONS	G-6
TRIP RATES, REDUCTION FACTORS, AND SOURCES	G-8
TRAFFIC DISTRIBUTION ASSUMPTIONS	G-9
INTERSECTION LEVELS OF SERVICE (AM PEAK HOUR)	G-10
INTERSECTION LEVELS OF SERVICE (PM PEAK HOUR)	G-11
FREEWAY LEVELS OF SERVICE (AM PEAK HOUR)	G-12
FREEWAY LEVELS OF SERVICE (PM PEAK HOUR)	G-13
PREFERRED ALTERNATIVE TRIP GENERATION	G-14
PREFERRED ALTERNATIVE INTERSECTION OPERATIONS	G-16
OPEN SPACE ALTERNATIVE TRIP GENERATION	G-18
OPEN SPACE ALTERNATIVE INTERSECTION OPERATIONS	G-20
NO ACTION ALTERNATIVE TRIP GENERATION	G-22
NO ACTION ALTERNATIVE INTERSECTION OPERATIONS	G-24

APPENDIX G
TRAFFIC AND CIRCULATION

Appendix G provides the background information referenced in Section 3.10 and Section 4.10 of this EIS including definitions of level of service, current traffic conditions, and traffic conditions resulting from the Preferred Alternative, Open Space Alternative, and the No Action Alternative.

Table G-1
Level of Service Criteria for Basic Freeway Sections

Level of Service	Max. Service Flow Rate (pcphpl)
A	600
B	960
C	1,440
D	1,824
E	2,300
F	varies

Abbreviation:
pcphpl = Passenger cars per hour per lane

Table G-2
Level Of Service Criteria For Intersections

Level-of-Service Criteria for Signalized Intersections (Operations Analysis)¹	
Level of Service	Average Stopped Delay (Sec/Veh)
A	< 5.0
B	5.1 to 15.0
C	15.1 to 25.0
D	25.1 to 40.0
E	40.1 to 60.0
F	> 60.0

Level of Service Criteria for Unsignalized Intersections¹	
LOS	Average Stopped Delay (Sec/Veh)
A	< 5
B	5 - 10
C	10 - 20
D	20 - 30
E	30 - 45
F	> 45

¹Source: Transportation Research Board, Highway Capacity Manual, 1994.

Definition of Terms

Level of Service (LOS) - Levels of traffic congestion are described by six Level of Service categories (A - F) representing the best to worst conditions, respectively.

Delay - Levels of Service at intersections is determined based on delay. Delay represents the average length of time a vehicle is stopped in queue at an intersection.

Volume to Capacity Ratio (V/C) - Capacity analysis for intersections is based partially on the computation of the sum of critical movements divided by the capacity of those movements or the V/C ratio. In many planning applications V/C is used as the measure of effectiveness for level of service but delay is a better measure of effectiveness for level of service in most cases because delay is a perceived value.

Table G-3
June 1995 Peak Hour LOS for Key Segments of Regional Freeways

Locations	AM Peak Hour			
	Volume	LOS	Volume	LOS
U.S. Highway 101				
N/O Atherton - NB	1,405	B	3,489	E
N/O Atherton - SB	4,287	C	1,569	B
37 to Ignacio - NB	2,534	B	7,259	E
37 to Ignacio - SB	6,651	E	3,930	B
S/O Ignacio - NB	2,640	B	7,487	E
S/O Ignacio - SB	6,347	D	3,480	B
State Route 37				
101 to Atherton - WB	756	B	1,624	B
101 to Atherton - EB	2,097	B	1,196	B

Source: Whitlock & Weinberger Transportation, Inc. June 1995.

Abbreviation:

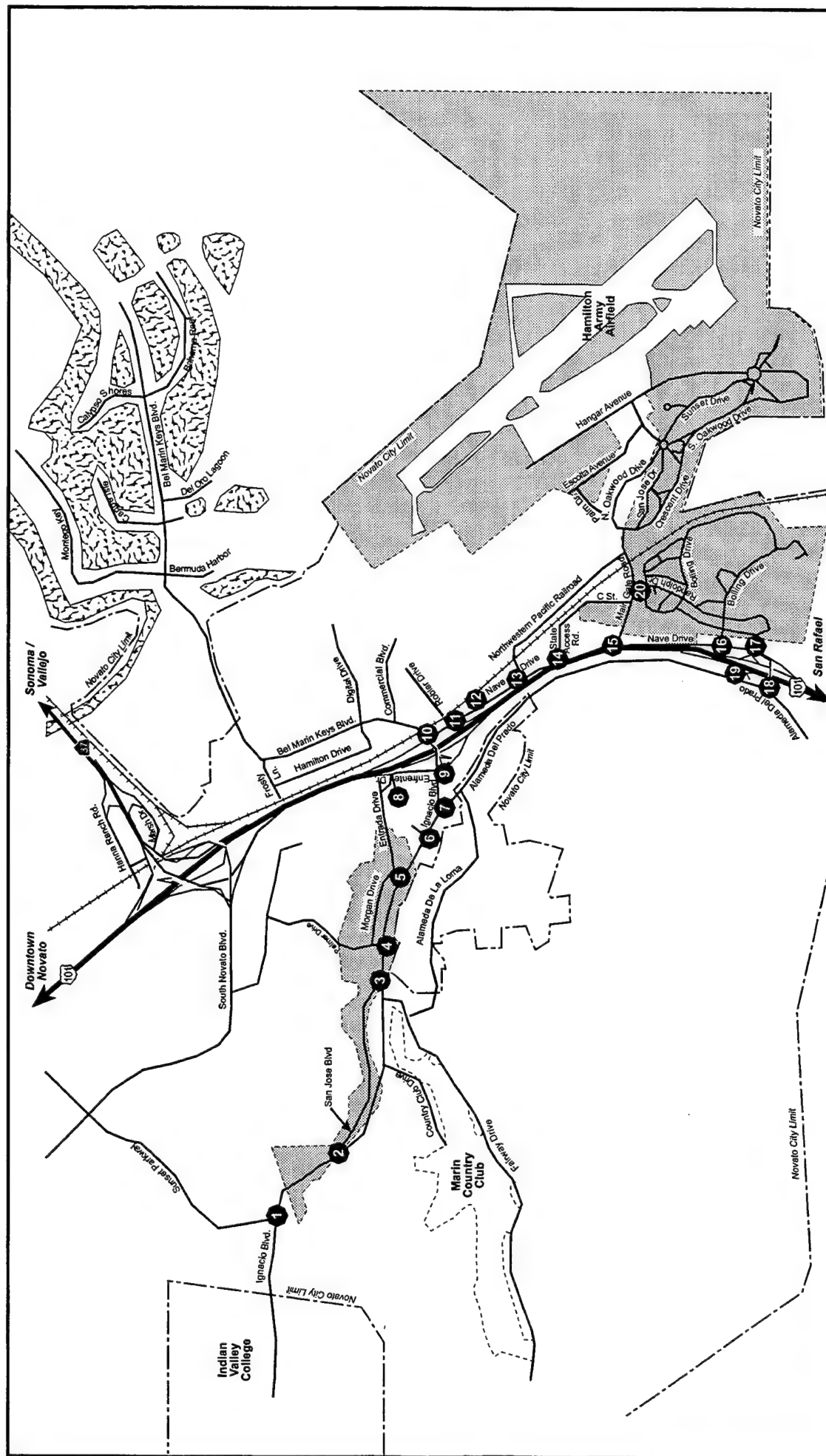
LOS = Level of Service

Note: Level of Service Methodology based on 1994 Highway Capacity Manual.

Table G-4
Functional Route Classification

Classification	Function(s)	Direct Land Access	Speed Limit	Parking	Comments
Freeway	Traffic Movement	None	50- 55 MPH	Prohibited	Grade separated intersections
Major Arterial	1st - Areawide Traffic Movement 2nd - Land Access	Limited	35-45 MPH	Generally Prohibited	
Minor Arterial	1st - Local Traffic Movement 2nd - Land Access	Restricted	25-40 MPH	Generally Permitted	Left-Turn Bays Provided at Most Intersections
Major Collector	1st - Collect/Distribute Traffic to Arterials 2nd - Land Access	Permitted	25-30 MPH	Permitted	Limited Through Traffic
Minor Collector	1st - Distribute Traffic to Primary Collectors/Arterials 2nd - Land Access	Permitted	20-25 MPH	Permitted	Through Traffic Should be Discouraged
Local	Land Access	Permitted	15-25 MPH	Permitted	Through Traffic Should be Discouraged

Sources: Institute of Transportation Engineers, Transportation and Land Development, 1988; and Fehr & Peers Associates, 1995.



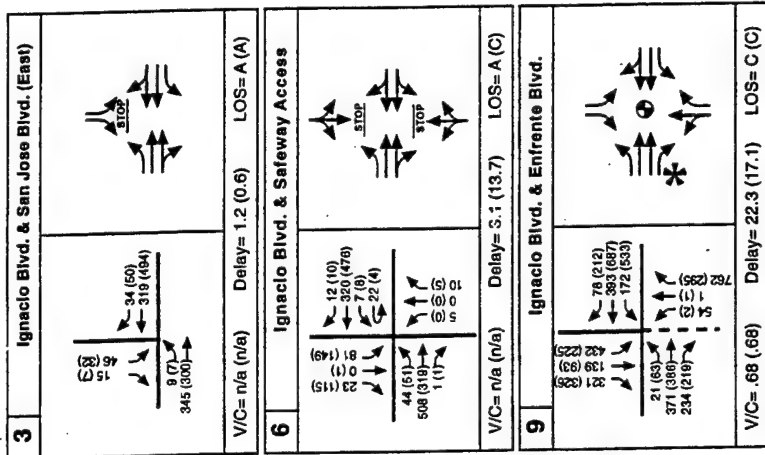
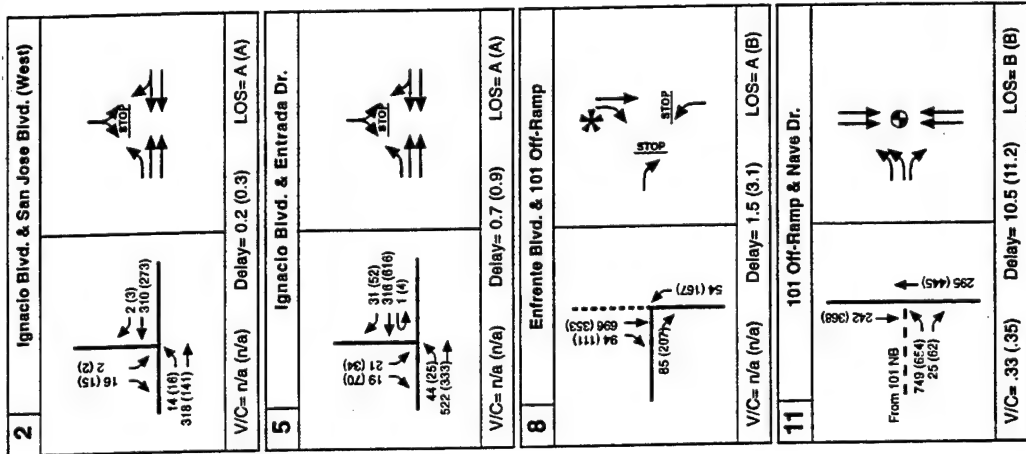
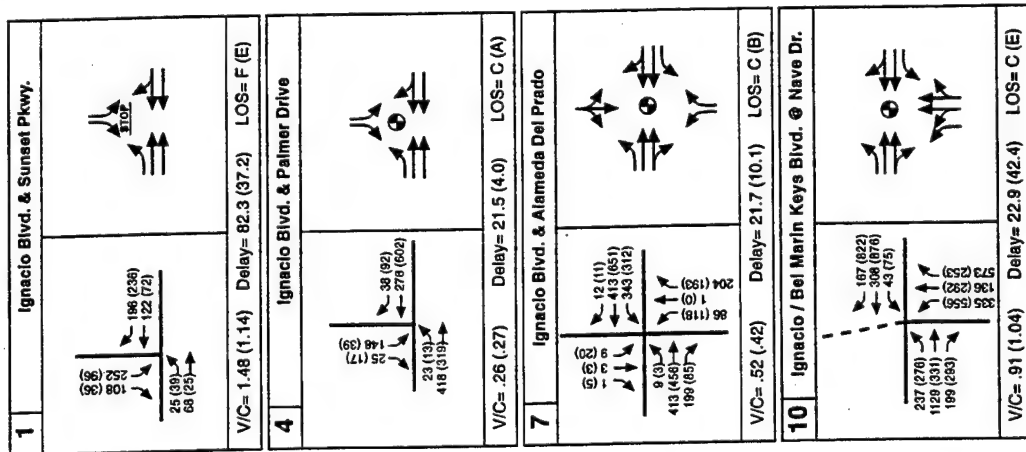
The ROI for this EIS includes regional systems and the surrounding community street system.



***DODHF Novato Intersections
Identification***
DOD Housing Facility
Novato, California

Figure G-1

Source: Fehr & Peers Associates, 1996



Key:

114 (158) = 7:45 - 8:45 AM (4:30 - 5:30 PM)

- Traffic Signal
 - Free Right - Turn
 - Freeway Ramps
 n/a - Not Applicable

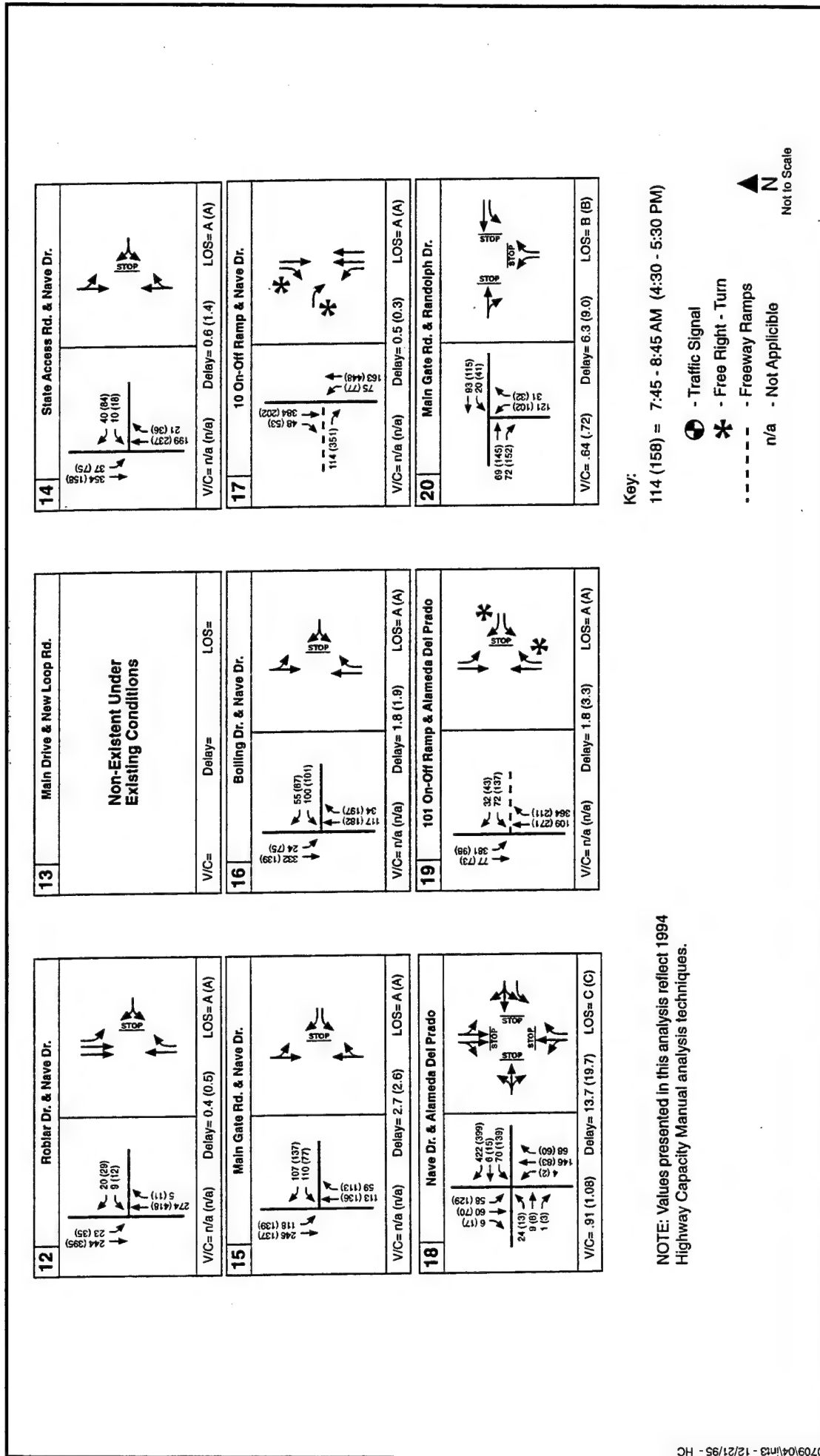
N
 Not to Scale

Traffic volume data geometric configurations, and Level of Service for intersections 1-11, presented here, correspond to the intersection locations detailed in Figure G-1.

Existing Intersection Operations (1-11)

DOD Housing Facility
Novato, California

Figure G-2



Traffic volume data and geometric configurations for intersections 12-19, presented here, correspond to the intersection locations detailed in Figure G-1.

Existing Intersection Operations (12-20)

DOD Housing Facility
Novato, California

Figure G-3

**Table G-5
Trip Rates, Adjustment Factors, and Sources**

Land Use	Units	AM Peak Hour		PM Peak Hour		Adjustment Factors	Trip Rates
		Trip Rates		Trip Rates			
		In	Out	In	Out		
Current Military Use:							
Multi-Family Housing	Du's	0.14	0.41	0.37	0.40	1.0	Fehr & Peers Travel Survey
Single Family Housing	Du's	0.60	0.44	0.57	0.57	1.0	Fehr & Peers Travel Survey
Warehouse	KSF	0.21	0.09	0.19	0.29	0.4 (0.6)	SANDAG (Warehousing)
Commissary	KSF	0.46	0.17	2.14	2.14	0.2 (0.6)	Fehr & Peers Travel Survey
Commercial	KSF	0.58	0.38	3.96	3.96	0.2 (0.6)	SANDAG (Neigh. Shop)
Exchange Commercial	KSF	0.22	0.13	0.78	0.78	1.0	Fehr & Peers Travel Survey
Gas Station	KSF	2.25	2.25	8.25	8.25	0.2	SANDAG (Old Svce. Station)
Community Services	KSF	0.00	2.09	0.72	1.13	0.8	ITE 495 (Rec. Comm. Cntr)
Office	KSF	2.02	0.22	0.42	1.66	0.8	SANDAG (Standard Office)
Theatre	KSF	0.02	0.00	0.45	0.19	0.1	SANDAG (Movie Theatre)
Chapel	KSF	0.06	0.01	0.07	0.07	0.2	SANDAG (Church)
Racquetball/Gym/Bowling	KSF	0.30	0.22	0.18	0.28	0.2	SANDAG (Racquetball Club)
Proposed Civilian Land Uses:							
Low Density Housing	Du's	0.20	0.56	0.66	0.36	1.0	ITE 210 (Sgle Detached Hsing)
Med Density Housing	Du's	0.08	0.36	0.35	0.19	1.0	ITE 230 (Condo/Townhouse)
Med Density	Du's	0.08	0.36	0.35	0.19	1.0	ITE 230 (Condo/Townhouse)
Multi-Family Housing	Du's	0.08	0.36	0.35	0.19	1.0	ITE 230 (Condo/Townhouse)
Parkland (Developed City Park)	Acres	0.60	0.60	1.20	1.20	0.6	SANDAG (Devel. City Park)
Parkland (Undeveloped)	Acres	0.05	0.05	0.10	0.10	0.6	SANDAG (undevel. City Park)
Passive Park	Acres	0.06	0.06	0.12	0.12	0.6	SANDAG (Undev. Neigh. Park)
Community Facilities	Acres	2.96	0.56	1.32	5.29	0.6	ITE 730 (Government Office)
Charter School/Day Care/Library	Acres	7.60	7.60	7.20	7.20	1.0	SANDAG (Day Care)
Congregate Care Facility	Du's	0.04	0.02	0.10	0.07	1.0	SANDAG (Congregate Care)
Bed Emergency Shelter	Beds	0.04	0.02	0.080	0.080	1.0	SANDAG (Congregate Care)
General Offices	Acres	30.24	3.36	7.80	31.20	1.0	SANDAG (Standard Office)
Neighborhood Commercial	Acres	11.52	7.68	26.40	26.40	0.4	SANDAG (Neigh. Shop)
Public Facilities	Acres	0.00	2.09	0.72	1.13	0.8	ITE 495 (Rec. Comm. Cntr)
Chapel	KSF	0.12	0.03	0.14	0.14	0.4	SANDAG (Church)
Movie Theatre	KSF	0.09	0.01	1.79	0.77	0.4	SANDAG (Movie Theatre)
Artist Workspace	KSF	1.94	0.22	0.86	1.54	0.4	SANDAG (Civic Center)
Bed & Breakfast Inn	Rms	0.36	0.29	0.43	0.33	1.0	ITE 310 (Hotel)
Health Club	KSF	0.53	0.38	1.30	0.86	0.6	SANDAG (Racquetball Club)
Conference Hall	KSF	1.00	0.11	0.21	0.83	0.4	SANDAG (Standard Office)
Transit Center	Acres	29.40	12.60	13.50	31.50	1.0	SANDAG (Transit Station)

**Table G-6
Traffic Distribution Assumptions**

Origin/Destination	AM Peak Hour		PM Peak Hour	
	Residential	Nonresidential	Residential	Nonresidential
Local Novato	65%	40%	70%	55%
US 101 South	25%	15%	22%	14%
US 101 North	7%	35%	6%	25%
State Route 37 East	2%	8%	1%	5%
West Marin	1%	2%	1%	1%
Total	100%	100%	100%	100%

Table G-7
Intersection Levels of Service
AM Peak Hour

Intersections	Control Type	Preferred General Plan ¹			Preferred Alternative (Revised Reuse Plan)			Open Space Alternative			No Action Alternative		
		V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Ignacio Blvd @ Sunset Pkwy	Stop (T Intersection)	2.53	OVRFL	F	2.53	OVRFL	F	2.51	OVRFL	F	2.49	OVRFL	F
Ignacio Blvd @ San Jose Blvd W	Stop (T Intersection)	n/a	0.30	A	n/a	0.40	A	n/a	0.20	A	n/a	0.10	A
Ignacio Blvd @ San Jose Blvd E	Stop (T Intersection)	n/a	2.50	A	n/a	2.90	A	n/a	0.60	A	n/a	0.10	A
Ignacio Blvd @ Palmer Dr	Signal (T Intersection)	0.28	8.10	B	0.28	8.10	B	0.26	8.40	B	0.25	8.60	B
Ignacio Blvd @ Entrada Dr	Stop (T Intersection)	n/a	9.50	B	n/a	13.20	C	n/a	1.40	A	n/a	0.60	A
Ignacio Blvd @ Safeway Access	Stop (4-way Intersection)	n/a	5.10	B	n/a	4.90	A	n/a	3.20	A	n/a	2.50	A
Ignacio Blvd @ Alameda Del Prado	Signal (4-way Intersection)	0.58	19.10	C	0.58	18.90	C	0.53	19.30	C	0.50	19.10	C
Hwy 101 SB Off @ Enfrente Blvd	Stop (T Intersection)	n/a	1.40	A	n/a	1.40	A	n/a	1.40	A	n/a	1.40	A
Ignacio Blvd @ Enfrente Blvd	Signal (4-way Intersection)	0.64	20.90	C	0.63	20.50	C	0.60	19.90	C	0.56	19.10	C
Ignacio Blvd @ Nave Dr	Signal (T Intersection)	0.93	21.70	C	0.97	21.80	C	0.94	20.80	C	0.90	19.70	C
Hwy 101 NB Off @ Nave Dr	Signal (T Intersection)	0.60	12.50	B	0.60	12.40	B	0.56	12.40	B	0.51	12.30	B
Roblar Dr @ Nave Dr	Stop (T Intersection)	n/a	0.60	A	n/a	0.60	A	n/a	0.60	A	n/a	0.60	A
New Loop Rd @ Nave Dr	Signal (T Intersection)	0.51	7.60	B	0.47	8.30	B	0.47	8.20	B	0.43	8.90	B
State Access Rd @ Nave Dr	Signal (T Intersection)	0.48	3.00	A	0.43	2.10	A	0.43	1.90	A	0.37	0.20	A
Main Gate Rd @ Nave Dr	Signal (T Intersection)	0.68	16.80	C	0.64	15.40	C	0.63	15.10	C	0.56	13.70	B
Bolling Dr @ Nave Dr	Signal (T Intersection)	0.58	6.30	B	0.56	5.20	B	0.55	5.10	B	0.43	1.10	A
Hwy 101 Off-Ramp @ Nave Dr	Yield (T Intersection)	n/a	0.20	A	n/a	0.20	A	n/a	0.20	A	n/a	0.20	A
Nave Dr @ Alameda Del Prado	Signal (4-way Intersection)	0.48	8.70	B	0.45	8.60	B	0.45	8.60	B	0.39	8.30	B
Hwy 101 SB Ramp @ Alameda Del Prado	Stop (T Intersection)	n/a	10.70	C	n/a	9.60	B	n/a	8.70	B	n/a	7.00	B
Main Gate Rd @ Randolph Dr	Signal (T Intersection)	0.45	0.30	A	0.45	0.30	A	0.45	0.30	A	0.42	0.20	A

NOTE:

¹ Represents cumulative conditions under the City of Novato's Preferred General Plan.

n/a - Volume to capacity ratio not applicable for unsignalized intersections.

OVRFL - Overflow

Table G-8
Intersection Levels of Service
PM Peak Hour

Intersections	Control Type	Preferred General Plan ¹			Preferred Alternative (Revised Reuse Plan)			Open Space Alternative			No Action Alternative		
		V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Ignacio Blvd @ Sunset Pkwy	Stop (T Intersection)	1.93	521.40	F	1.77	286.20	F	1.76	272.10	F	1.69	214.50	F
Ignacio Blvd @ San Jose Blvd W	Stop (T Intersection)	n/a	0.70	A	n/a	0.40	A	n/a	0.30	A	n/a	0.10	A
Ignacio Blvd @ San Jose Blvd E	Stop (T Intersection)	n/a	34.50	E	n/a	5.00	B	n/a	2.50	A	n/a	0.10	A
Ignacio Blvd @ Palmer Dr	Signal (T Intersection)	0.39	3.60	A	0.35	3.50	A	0.34	3.20	A	0.30	2.80	A
Ignacio Blvd @ Entrada Dr	Stop (T Intersection)	n/a	168.30	F	n/a	36.00	D	n/a	11.10	C	n/a	0.90	A
Ignacio Blvd @ Safeway Access	Stop (4-way Intersection)	n/a	422.80	F	n/a	222.50	F	n/a	165.50	F	n/a	82.20	F
Ignacio Blvd @ Alameda Del Prado	Signal (4-way Intersection)	0.69	10.00	B	0.63	9.70	B	0.62	9.90	B	0.57	9.90	B
Hwy 101 SB Off @ Enfrente Blvd	Stop (T Intersection)	n/a	3.40	A	n/a	3.10	A	n/a	3.10	A	n/a	3.00	A
Ignacio Blvd @ Enfrente Blvd	Signal (4-way Intersection)	0.95	27.00	D	0.83	21.50	C	0.82	21.00	C	0.78	19.50	C
Ignacio Blvd @ Nave Dr	Signal (T Intersection)	1.22	98.00	F	1.09	48.40	E	1.07	43.00	E	1.02	32.50	D
Hwy 101 NB Off @ Nave Dr	Signal (T Intersection)	0.82	10.70	B	0.67	10.30	B	0.66	10.10	B	0.60	10.10	B
Roblar Dr @ Nave Dr	Stop (T Intersection)	n/a	3.80	A	n/a	1.50	A	n/a	1.40	A	n/a	1.20	A
New Loop Rd @ Nave Dr	Signal (T Intersection)	0.74	8.80	B	0.55	9.70	B	0.52	9.20	B	0.43	9.80	B
State Access Rd @ Nave Dr	Signal (T Intersection)	0.79	12.80	B	0.46	3.40	A	0.44	3.20	A	0.36	0.10	A
Main Gate Rd @ Nave Dr	Signal (T Intersection)	0.85	20.80	C	0.54	11.40	C	0.53	11.10	B	0.44	8.30	B
Bolling Dr @ Nave Dr	Signal (T Intersection)	0.58	5.00	B	0.49	2.80	A	0.48	2.60	A	0.42	2.30	A
Hwy 101 NB Ramps @ Nave Dr	Yield (T Intersection)	n/a	0.50	A	n/a	0.50	A	n/a	0.50	A	n/a	0.50	A
Nave Dr @ Alameda Del Prado	Signal (4-way Intersection)	0.49	6.70	B	0.40	6.60	B	0.39	6.70	B	0.32	5.80	B
Hwy 101 SB Ramp @ Alameda Del Prado	Stop (T Intersection)	n/a	3.60	A	n/a	3.10	A	n/a	3.10	A	n/a	1.50	A
Main Gate Rd @ Randolph Dr	Signal (T Intersection)	0.45	0.30	A	0.47	0.30	A	0.46	0.30	A	0.42	0.20	A

NOTE:
¹ Represents cumulative conditions under the City of Novato's Preferred General Plan.
n/a - Volume to capacity ratio not applicable for unsignalized intersections.
OVRFL - Overflow

Table G-9
Freeway Levels of Service
AM Peak Hour

Freeway Segments	Preferred General Plan ¹		Preferred Alternative (Revised Reuse Plan)		Open Space Alternative		No Action Alternative	
	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS
U.S. Highway 101								
N/O Atherton - NB	2,922	C	2,891	C	2,875	B	2,850	B
N/O Atherton - SB	4,713	D	4,678	D	4,673	D	4,638	D
37 to Ignacio - NB	4,029	C	3,966	C	3,899	C	3,789	C
37 to Ignacio - SB	7,499	F	7,452	F	7,439	F	7,317	F
S/O Ignacio - NB	3,799	C	3,792	C	3,731	C	3,663	C
S/O Ignacio - SB	6,847	E	6,808	E	6,804	E	6,727	E
State Route 37								
101 to Atherton - WB	3,378	D	3,370	D	3,369	D	3,354	D
101 to Atherton - EB	1,107	B	1,098	B	1,090	B	1,077	B

NOTE:

¹ Represents cumulative conditions under the City of Novato's Preferred General Plan.
Levels of service criteria based on 1994 Highway Capacity Manual analysis techniques.

Table G-10
Freeway Levels of Service
PM Peak Hour

Freeway Segments	Preferred General Plan		Preferred Alternative (Revised Reuse Plan)		Open Space Alternative		No Action Alternative	
	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS
U.S. Highway 101								
N/O Atherton - NB	4,349	D	4,208	C	4,201	C	4,165	C
N/O Atherton - SB	3,796	C	3,655	C	3,640	C	3,599	C
37 to Ignacio - NB	8,822	F	8,485	F	8,464	F	8,306	F
37 to Ignacio - SB	6,089	E	5,781	E	5,718	E	5,525	E
S/O Ignacio - NB	8,512	F	8,460	F	8,449	F	8,406	F
S/O Ignacio - SB	5,326	D	5,086	D	5,079	D	4,949	D
State Route 37								
101 to Atherton - WB	2,171	C	2,133	C	2,127	C	2,106	C
101 to Atherton - EB	4,007	E	3,967	E	3,965	E	3,948	E

NOTE:
¹ Represents cumulative conditions under the City of Novato's Preferred General Plan.
 Levels of service criteria based on 1994 Highway Capacity Manual analysis techniques.

Table G-11
Revised Reuse Plan Alternative (Preferred Alternative) Trip Generation

Planning Area	Land Use	Amount	AM Peak Hour			PM Peak Hour		
			Trip Rates		Total	Trip Rates		Total
			In	Out	Trips	In	Out	Trips
PA 1								
Military Subtract	Multi-Family Housing	505 Du's	0.14	0.41	-277.8	0.37	0.40	-388.9
Preferred Alternative	Low Density Housing	275 Du's	0.20	0.56	208.5	0.66	0.36	280.5
	Med Density Housing	125 Du's	0.08	0.36	54.9	0.35	0.19	67.5
	Med Density	100 Du's	0.08	0.36	44.0	0.35	0.19	54.0
	Multi-Family Housing							
	Total Housing	500 Du's			307.3			402.0
	Parkland	7 Acres	0.60	0.60	8.4	1.20	1.20	16.8
	Open Space	7 Acres	0.05	0.05	0.7	0.10	0.10	1.3
Total Trips					38.6			31.3
PA 2								
Military Subtract	Multi-Family Housing	708 Du's	0.14	0.41	-389.4	0.37	0.40	-545.2
Preferred Alternative	Med Density Housing	527 Du's	0.08	0.36	231.4	0.35	0.19	284.6
	Hillside Housing	150 Du's	0.08	0.36	66.0	0.35	0.19	81.0
	Capehart Housing	31 Du's	0.08	0.36	13.6	0.35	0.19	16.7
	Total Housing	708 Du's			311.0			382.3
	Open Space	88 Acres	0.05	0.05	8.4	0.10	0.10	16.9
	Parkland	6 Acres	0.60	0.60	7.2	1.20	1.20	14.4
	Community Facility	6 Acres	2.96	0.56	21.1	1.32	5.29	39.7
Total					-41.6			-91.9
PA 3 (USCG Spanish Hsg)								
Military Subtract	Single Family Housing	282 Du's	0.60	0.44	-293.3	0.57	0.57	-321.5
Preferred Alternative	USCG Residential	282 Du's	0.60	0.44	293.3	0.57	0.57	321.5
	Total Housing	282 Du's			293.3			321.5
	USCG Open Space	32 Acres	0.05	0.05	3.1	0.10	0.10	6.1
	USCG Parkland	26 Acres	0.60	0.60	31.2	1.20	1.20	62.4
	USCG Community Facility	5 Acres	2.96	0.56	17.6	1.32	5.29	33.1
Total					51.9			101.6
PA 4								
Military Subtract	Warehouse	45.9 KSF	0.21	0.09	-13.8	0.19	0.29	-22.0
	Commissary	20 KSF	0.46	0.17	-12.6	2.14	2.14	-85.6
Preferred Alternative	80-Bed Emergency Shelter	80 Beds	0.04	0.02	4.8	0.080	0.080	12.8
	Congregate Care	210 Du's	0.04	0.02	12.6	0.10	0.07	35.7
	Transit Center	2 Acres	17.60	7.56	50.3	8.10	18.90	54.0
Total					41.4			-5.1
PA 5								
Military Subtract	Commercial	46.6 KSF	0.58	0.38	-44.8	3.96	3.96	-369.2
	Gas Station	4.5 KSF	2.25	2.25	-20.3	8.25	8.25	-74.3
	Community Services	13 KSF	0.00	2.09	-27.2	0.72	1.13	-24.1
	Office	16.8 KSF	2.02	0.22	-37.6	0.42	1.66	-34.9
	Warehouse	3 KSF	0.21	0.09	-0.9	0.19	0.29	-1.4
Preferred Alternative	Charter School/Library/Day Care	20 Acres	2.96	0.56	70.4	1.32	5.29	132.2
	Neighborhood	2 Acres	11.52	7.68	38.4	26.40	26.40	105.6
	Commercial							
	Transit Center	2 Acres	17.60	7.56	50.3	8.10	18.90	54.0
Total					28.5			-212.1

Table G-11 (continued)
Revised Reuse Plan Alternative (Preferred Alternative) Trip Generation

Planning Area	Land Use	Amount	AM Peak Hour			PM Peak Hour		
			Trip Rates		Total	Trip Rates		Total
			In	Out	Trips	In	Out	Trips
PA 6								
Military Subtract	Office	13.5 KSF	2.02	0.22	-30.2	0.42	1.66	-28.1
	Theatre	6 KSF	0.02	0.00	-0.1	0.45	0.19	-3.8
	Chapel	10.7 KSF	0.06	0.01	-0.7	0.07	0.07	-1.5
Preferred Alternative	Chapel	10.7 KSF	0.12	0.03	1.6	0.14	0.14	3.0
	Developed City Park	1 Acres	0.60	0.60	1.2	1.20	1.20	2.4
	Movie Theatre	6 KSF	0.09	0.01	0.6	1.79	0.77	15.4
	Artist Workspace	18 KSF	1.94	0.22	38.9	0.86	1.54	43.2
Total					11.2			30.5
PA 7								
Military Subtract	Community Services	10 KSF	0.00	2.09	-20.9	0.72	1.13	-18.5
Preferred Alternative	Open Space	3 Acres	0.05	0.05	0.3	0.10	0.10	0.6
	Parkland	3 Acres	0.60	0.60	3.6	1.20	1.20	7.2
Total					-17.0			-10.7
PA 8								
Military Subtract	Racquetball/Gym/Bowling	20 KSF	0.30	0.22	-10.4	0.18	0.28	-9.2
Preferred Alternative	USCG Parkland	3 Acres	0.60	0.60	3.6	1.20	1.20	7.2
Total					-6.8			-2.0
PA 9								
Military Subtract	None	0	n/a	n/a	n/a	n/a	n/a	n/a
Preferred Alternative	USCG Community Facility	5 Acres	2.96	0.56	17.6	1.32	5.29	33.1
Total					17.6			33.1
PA 10								
Military Subtract	None	0	n/a	n/a	n/a	n/a	n/a	n/a
Preferred Alternative	Parkland	17 Acres	0.60	0.60	20.4	1.20	1.20	40.8
	USCG Parkland	7 Acres	0.60	0.60	8.4	1.20	1.20	16.8
Total					28.8			57.6
Runway								
Military Subtract	None	0	n/a	n/a	n/a	n/a	n/a	n/a
Preferred Alternative	Open Space	0 Acres	0.00	0.00	0.0	0.00	0.00	0.0
Total					0.0			0.0

Total Military Subtract	(1,180)		(1,928)
Total Preferred Alternative Trips	1,324		1,844

Net New Trips	144		(84)
---------------	-----	--	------

NOTE:

(XXX) - Trips lost as a result of Base conversion

1	Ignacio Blvd. & Sunset Pkwy.		V/C= 2.52 (1.77) Delay= OVFL (278.2) LOS= F (F)
4	Ignacio Blvd. & Palmer Drive		V/C= .28 (.35) Delay= 8.1 (3.5) LOS= B (A)
7	Ignacio Blvd. & Alameda Del Prado		V/C= .58 (.63) Delay= 19.0 (9.8) LOS= C (B)
10	Ignacio / Bel Marin Keys Blvd. @ Nave Dr.		V/C= 0.95 (1.08) Delay= 21.2 (44.8) LOS= C (E)

2	Ignacio Blvd. & San Jose Blvd. (West)		V/C= 0.0 (0.0) Delay= 0.3 (0.4) LOS= A (A)
5	Ignacio Blvd. & Entrada Dr.		V/C= 0.0 (0.0) Delay= 12.3 (34.8) LOS= C (E)
8	Enfrente Blvd. & 101 Off-Ramp		V/C= 0.0 (0.0) Delay= 1.4 (3.1) LOS= A (A)
11	101 Off-Ramp & Nave Dr.		V/C= 0.58 (0.67) Delay= 12.4 (10.3) LOS= B (B)

3	Ignacio Blvd. & San Jose Blvd. (East)		V/C= 0.0 (0.0) Delay= 2.8 (4.8) LOS= A (A)
6	Ignacio Blvd. & Safeway Access		V/C= 0.0 (0.0) Delay= 4.7 (217.2) LOS= A (F)
9	Ignacio Blvd. & Enfrente Blvd.		V/C= .62 (.83) Delay= 20.4 (21.5) LOS= C (C)

Key:

114 (158) = 7:45 - 8:45 AM (4:30 - 5:30 PM)

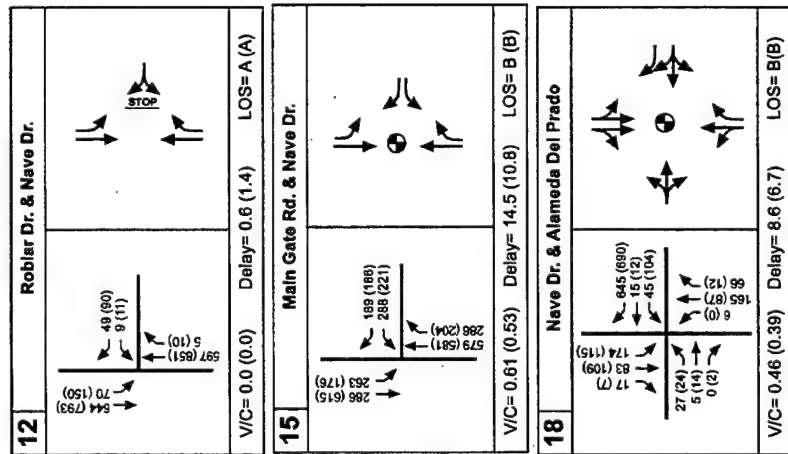
- - Traffic Signal
- * - Free Right - Turn
- - - - - Freeway Ramps
- n/a - Not Applicable

Intersection locations correspond to those labeled on Figure G-1.

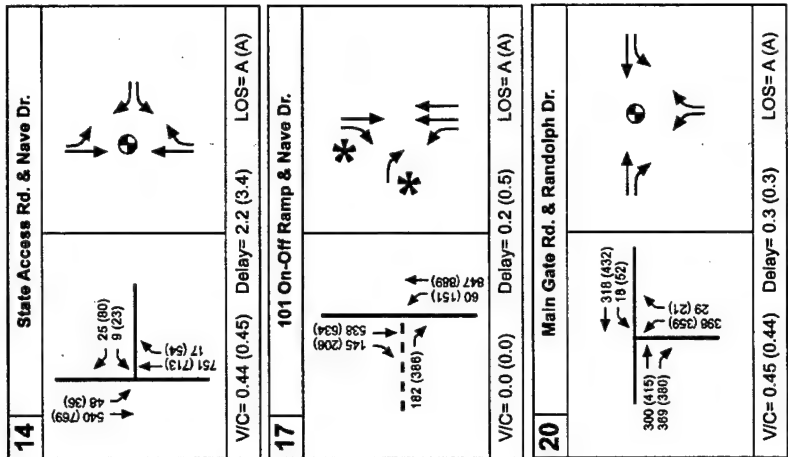
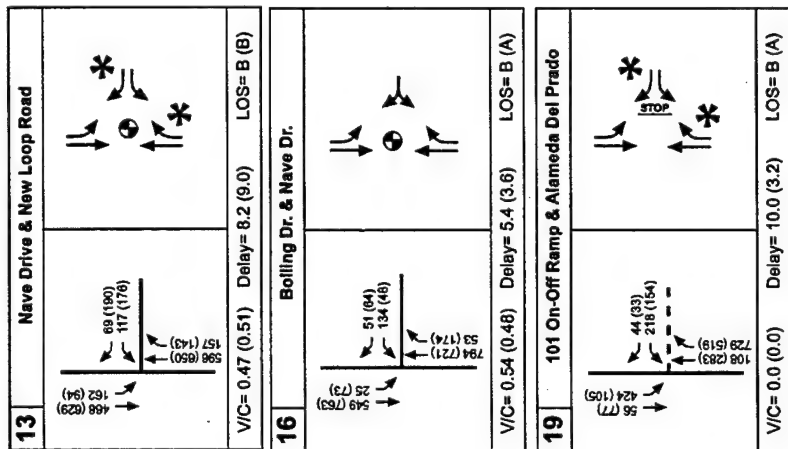
Revised Reuse Plan Alternative Intersection Operations (1-11)

DOD Housing Facility
Novato, California

Figure G-4



NOTE: Values presented in this analysis reflect 1994 Highway Capacity Manual analysis techniques.



Key:

114 (158) = 7:45 - 8:45 AM (4:30 - 5:30 PM)

- - Traffic Signal
 - * - Free Right - Turn
 - - Freeway Ramps
 - n/a - Not Applicable
- Not to Scale

Intersection locations correspond to those labeled on Figure G-1.

Revised Reuse Plan Alternative Intersection Operations (12-20)

DOD Housing Facility
Novato, California

Figure G-5

Table G-12
Open Space Alternative Trip Generation

Planning Area	Land Use	Amount	AM Peak Hour			PM Peak Hour		
			Trip Rates		Total	Trip Rates		Total
			In	Out	Trips	In	Out	Trips
PA 1								
Military Subtract	Multi-Family Housing	505 Du's	0.14	0.41	-277.8	0.37	0.40	-388.9
OS Alternative	Parkland/Open Space	98 Acres	0.60	0.60	117.6	1.20	1.20	235.2
Total Trips					-160.2			-153.7
PA 2								
Military Subtract	Multi-Family Housing	708 Du's	0.14	0.41	-389.4	0.37	0.40	-545.2
OS Alternative	Med Density Housing	527 Du's	0.08	0.36	231.4	0.35	0.19	284.6
	Hillside Housing	150 Du's	0.08	0.36	66.0	0.35	0.19	81.0
	Capehart Housing	31 Du's	0.08	0.36	13.6	0.35	0.19	16.7
	Total Housing	708 Du's			311.0			382.3
	Open Space	88 Acres	0.05	0.05	8.4	0.10	0.10	16.9
	Parkland	6 Acres	0.60	0.60	7.2	1.20	1.20	14.4
	Community Facility	6 Acres	2.96	0.56	21.1	1.32	5.29	39.7
Total					-41.6			-91.9
PA 3								
Military Subtract	Single Family Housing	282 Du's	0.60	0.44	-293.3	0.57	0.57	-321.5
OS Alternative	USCG Residential	282 Du's	0.60	0.44	293.3	0.57	0.57	321.5
	Total Housing	282 Du's			293.3			321.5
	USCG Open Space	32 Acres	0.05	0.05	3.1	0.10	0.10	6.1
	USCG Parkland	26 Acres	0.60	0.60	31.2	1.20	1.20	62.4
	USCG Community Facility	5 Acres	2.96	0.56	17.6	1.32	5.29	33.1
Total					51.9			101.6
PA 4								
Military Subtract	Warehouse	45.9 KSF	0.21	0.09	-13.8	0.19	0.29	-22.0
	Commissary	20 KSF	0.46	0.17	-12.6	2.14	2.14	-85.6
OS Alternative	80-Bed Emergency Shelter	80 Beds	0.04	0.02	4.8	0.080	0.080	12.8
	Congregate Care	210 Du's	0.04	0.02	12.6	0.10	0.07	35.7
	Transit Center	2 Acres	17.60	7.56	50.3	8.10	18.90	54.0
Total					41.4			-5.1
PA 5								
Military Subtract	Commercial	46.6 KSF	0.58	0.38	-44.8	3.96	3.96	-369.2
	Gas Station	4.5 KSF	2.25	2.25	-20.3	8.25	8.25	-74.3
	Community Services	13 KSF	0.00	2.09	-27.2	0.72	1.13	-24.1
	Office	16.8 KSF	2.02	0.22	-37.6	0.42	1.66	-34.9
	Warehouse	3 KSF	0.21	0.09	-0.9	0.19	0.29	-1.4
OS Alternative	Charter School/Library/Day Care	20 Acres	2.96	0.56	70.4	1.32	5.29	132.2
	Neighborhood Commercial	2 Acres	11.52	7.68	38.4	26.40	26.40	105.6
	Transit Center	2 Acres	17.60	7.56	50.3	8.10	18.90	54.0
Total					28.5			-212.1

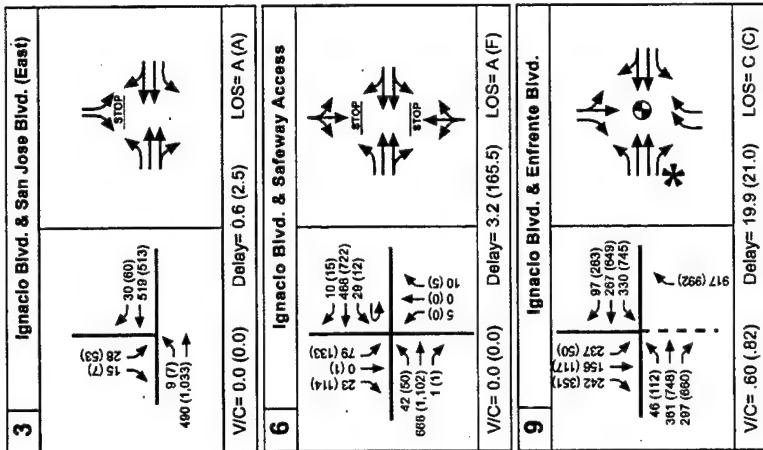
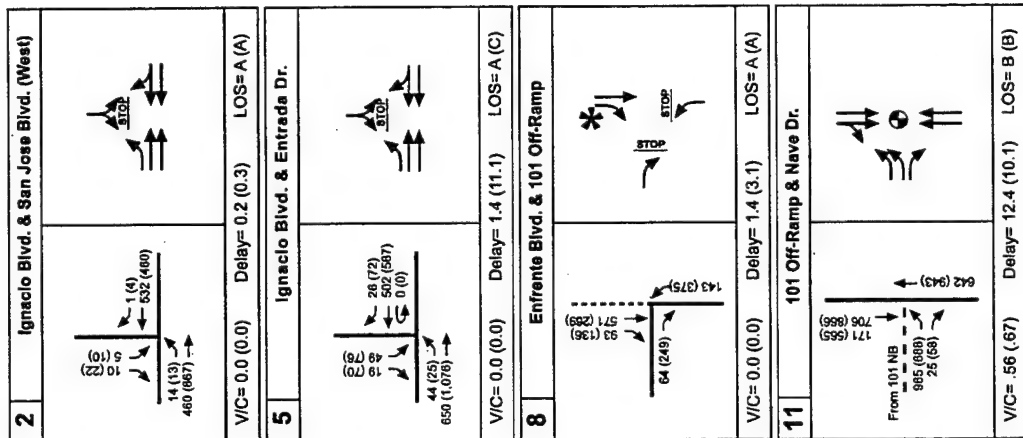
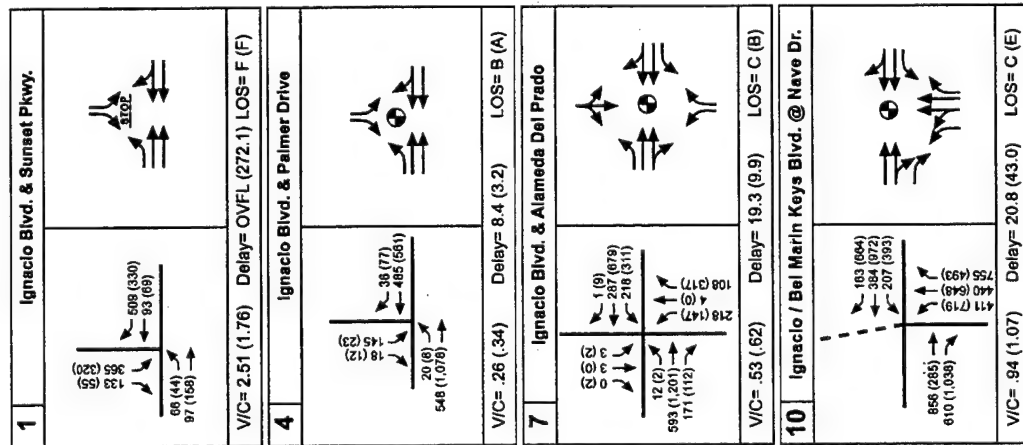
Table G-12 (continued)
Open Space Alternative Trip Generation

Planning Area	Land Use	Amount	AM Peak Hour			PM Peak Hour		
			Trip Rates		Total	Trip Rates		Total
			In	Out	Trips	In	Out	Trips
PA 6								
Military Subtract	Office	13.5 KSF	2.02	0.22	-30.2	0.42	1.66	-28.1
	Theatre	6 KSF	0.02	0.00	-0.1	0.45	0.19	-3.8
	Chapel	10.7 KSF	0.06	0.01	-0.7	0.07	0.07	-1.5
OS Alternative	Chapel	10.7 KSF	0.12	0.03	1.6	0.14	0.14	3.0
	Developed City Park	1 Acres	0.60	0.60	1.2	1.20	1.20	2.4
	Movie Theatre	6 KSF	0.09	0.01	0.6	1.79	0.77	15.4
	Artist Workspace	18 KSF	1.94	0.22	38.9	0.86	1.54	43.2
Total					11.2			30.5
PA 7								
Military Subtract	Community Services	10 KSF	0.00	2.09	-20.9	0.72	1.13	-18.5
OS Alternative	Open Space	3 Acres	0.05	0.05	0.3	0.10	0.10	0.6
Total	Parkland	3 Acres	0.60	0.60	3.6	1.20	1.20	7.2
					-17.0			-10.7
PA 8								
Military Subtract	Racquetball/Gym/Bowling	20 KSF	0.30	0.22	-10.4	0.18	0.28	-9.2
OS Alternative	USCG Parkland	3 Acres	0.60	0.60	3.6	1.20	1.20	7.2
Total					-6.8			-2.0
PA 9								
Military Subtract	None	0	n/a	n/a	n/a	n/a	n/a	n/a
OS Alternative	USCG Community Facility	5 Acres	2.96	0.56	17.6	1.32	5.29	33.1
Total					17.6			33.1
PA 10								
Military Subtract	None	0	n/a	n/a	n/a	n/a	n/a	n/a
OS Alternative	Parkland	17 Acres	0.60	0.60	20.4	1.20	1.20	40.8
	USCG Parkland	7 Acres	0.60	0.60	8.4	1.20	1.20	16.8
Total					28.8			57.6
Runway								
Military Subtract	None	0	n/a	n/a	n/a	n/a	n/a	n/a
OS Alternative	Open Space	0 Acres	0.00	0.00	0.0	0.00	0.00	0.0
Total					0.0			0.0

Total Military Subtract	(1,180)		(1,928)
Total Open Space Alternative Trips	1,125		1,659
Net New Trips	(55)		(269)

NOTE:

(XXX) - Trips lost as a result of Base conversion.



Key:

114 (158) = 7:45 - 8:45 AM (4:30 - 5:30 PM)

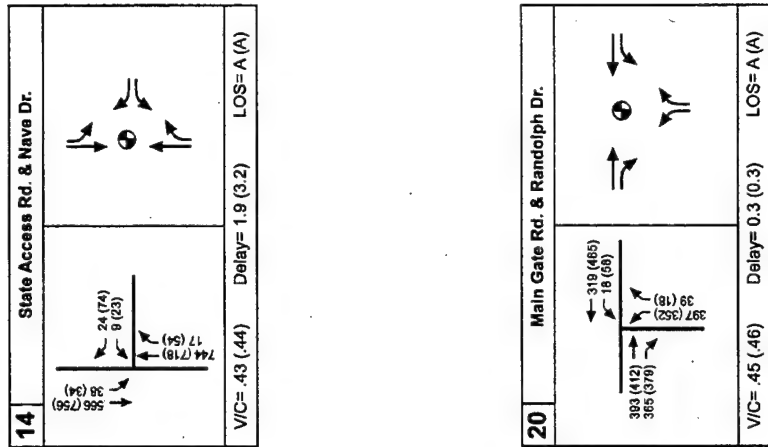
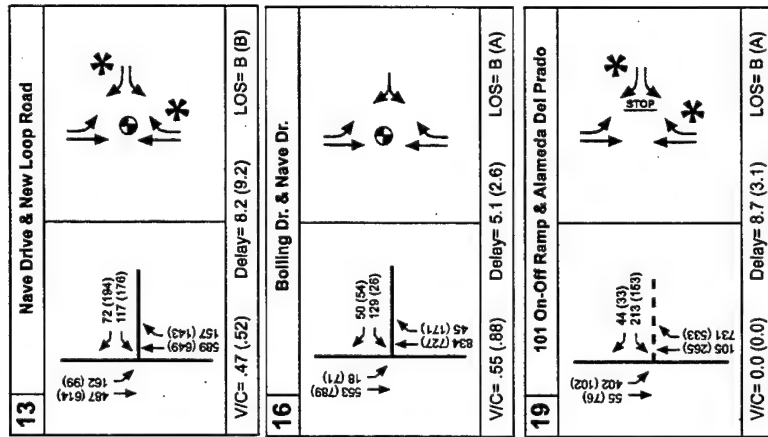
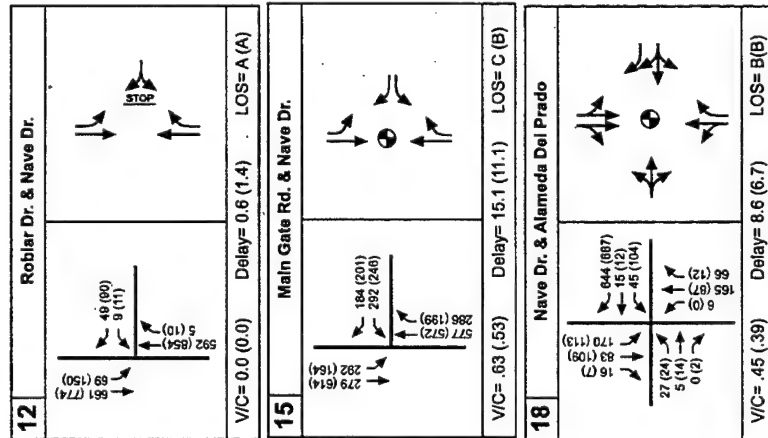
- Traffic Signal
- Free Right - Turn
- Freeway Ramps
- n/a - Not Applicable

Intersection locations correspond to those labeled on Figure G-1.

Open Space Alternative Intersection Operations (1-11)

DOD Housing Facility
Novato, California

Figure G-6



NOTE: Values presented in this analysis reflect 1994 Highway Capacity Manual analysis techniques.

Key:
 114 (158) = 7:45 - 8:45 AM (4:30 - 5:30 PM)
 - Traffic Signal
 - Free Right - Turn
 - Freeway Ramps
 n/a - Not Applicable

Intersection locations correspond to those labeled on Figure G-1.

Open Space Alternative Intersection Operations (12-20)

DOD Housing Facility
 Novato, California

Figure G-7

Table G-13
No Action Alternative Trip Generation

Planning Area	Land Use	Amount	AM Peak Hour			PM Peak Hour				
			Trip Rates		Total	Trip Rates		Total		
			In	Out	Trips	In	Out	Trips		
PA 1	Military Subtract	Multi-Family Housing	505	-505 Du's	0.14	0.41	-277.8	0.37	0.40	-388.9
	Total						-277.8			-388.9
PA 2	Military Subtract	Multi-Family Housing	708	-708 Du's	0.14	0.41	-389.4	0.37	0.40	-545.2
	Total						-389.4			-545.2
PA 3	(USCG Spanish Hsg)	Single Family Housing	282	-282 Du's	0.60	0.44	-293.3	0.57	0.57	-321.5
	Military Subtract						-293.3			-321.5
	No Action	USCG Residential	282	282 Du's	0.60	0.44	293.3	0.57	0.57	321.5
		Total Housing	282	282 Du's			293.3			321.5
		USCG Open Space	32	32 Acres	0.05	0.05	3.1	0.10	0.10	6.4
		USCG Parkland	26	26 Acres	0.60	0.60	31.2	1.20	1.20	62.4
		USCG Community Facility	5	5 Acres	2.96	0.56	17.6	1.32	5.29	33.1
	Total						51.9			101.9
PA 4	Military Subtract	Warehouse	45.9	-45.9 KSF	0.21	0.09	-13.8	0.19	0.29	-22.0
		Commissary	20	-20 KSF	0.46	0.17	-12.6	2.14	2.14	-85.6
	Total						-26.4			-107.6
PA 5	Military Subtract	Commercial	46.6	-46.6 KSF	0.58	0.38	-44.8	3.96	3.96	-369.2
		Gas Station	4.5	-4.5 KSF	2.25	2.25	-20.3	8.25	8.25	-74.3
		Community Services	13	-13 KSF	0.00	2.09	-27.2	0.72	1.13	-24.1
		Office	16.8	-16.8 KSF	2.02	0.22	-37.6	0.42	1.66	-34.9
		Warehouse	3	-3 KSF	0.21	0.09	-0.9	0.19	0.29	-1.4
	Total						-130.6			-503.9
PA 6	Military Subtract	Office	13.5	-14 KSF	2.02	0.22	-30.2	0.42	1.66	-28.1
		Theatre	6	-6 KSF	0.02	0.00	-0.1	0.45	0.19	-3.8
		Chapel	10.7	-11 KSF	0.06	0.01	-0.7	0.07	0.07	-1.5
	Total						-31.1			-33.4
PA 7	Military Subtract	Community Services	10	-10 KSF	0.00	2.09	-20.9	0.72	1.13	-18.5
	Total						-20.9			-18.5
PA 8	Military Subtract	Racquetball/Gym/Bowling	20	-20 KSF	0.30	0.22	-10.4	0.18	0.28	-9.2
	Total						-10.4			-9.2
	No Action	USCG Parkland	3	3 Acres	0.60	0.60	3.6	1.20	1.20	7.2
	Total						-6.8			-2.0

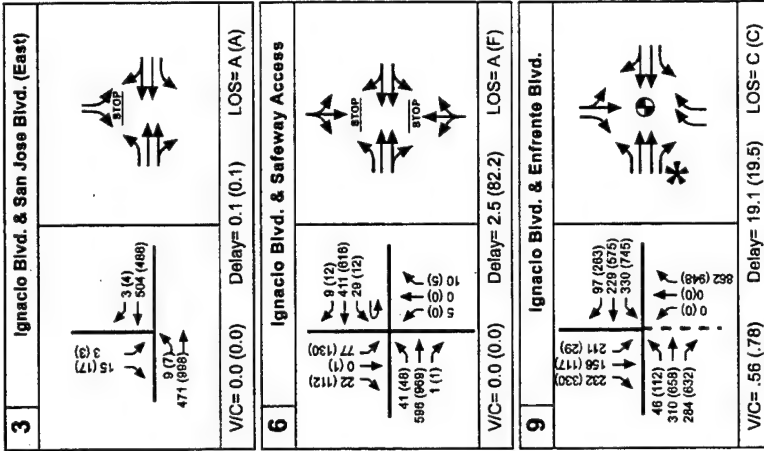
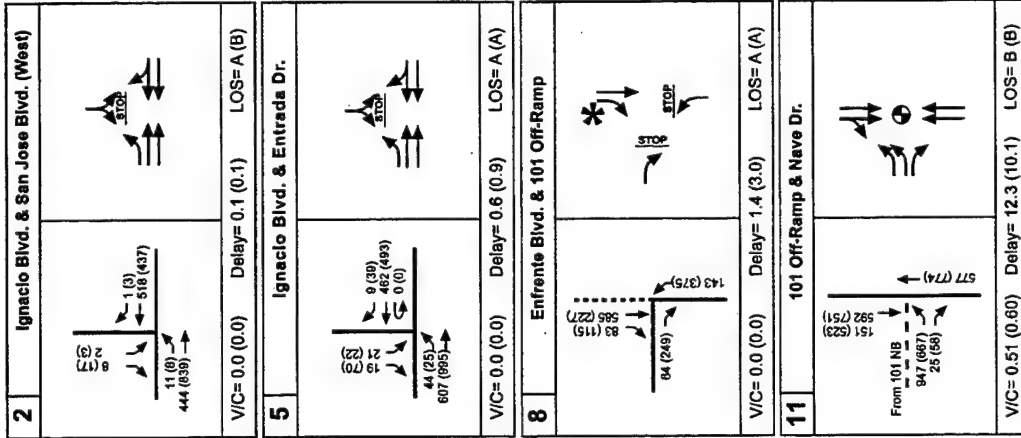
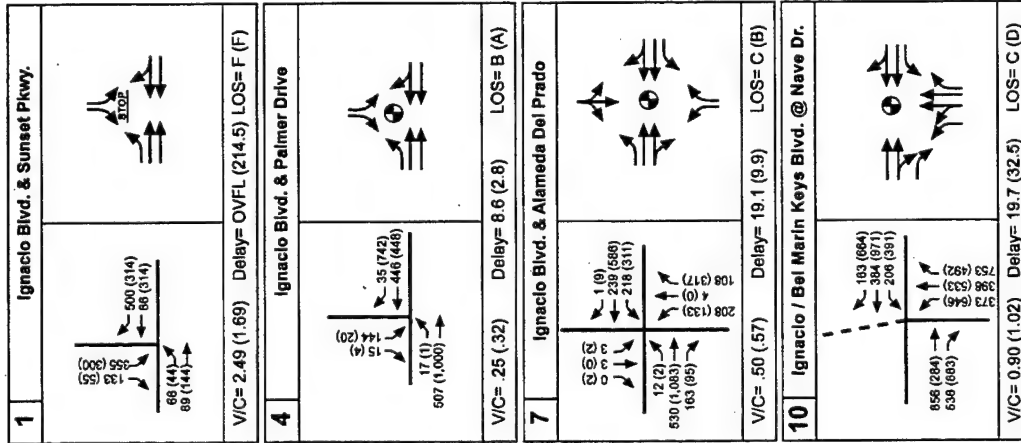
Table G-13 (continued)
No Action Alternative Trip Generation

Planning Area	Land Use	Amount	AM Peak Hour			PM Peak Hour		
			Trip Rates		Total	Trip Rates		Total
			In	Out	Trips	In	Out	Trips
PA 9								
Military Subtract	None	0 0	n/a	n/a	n/a	n/a	n/a	n/a
No Action	USCG Community Facility	5 5 Acres	2.96	0.56	17.6	1.32	5.29	33.1
Total					17.6			33.1
PA 10								
Military Subtract	None	0 0	n/a	n/a	n/a	n/a	n/a	n/a
No Action	USCG Parkland	7 7 Acres	0.60	0.60	8.4	1.20	1.20	16.8
Total					8.4			16.8
Runway								
Military Subtract	None	0 0	n/a	n/a	n/a	n/a	n/a	n/a

Total Military Subtract	(1,180)	(1,928)
Total No Action Trips	375	480

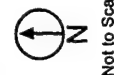
Net New Trips	(805)	(1,448)
---------------	-------	---------

NOTE:
(XXX) - Trips lost as a result of Base conversion.



Key:
 114 (158) = 7:45 - 8:45 AM (4:30 - 5:30 PM)

- - Traffic Signal
- * - Free Right - Turn
- - Freeway Ramps
- n/a - Not Applicable



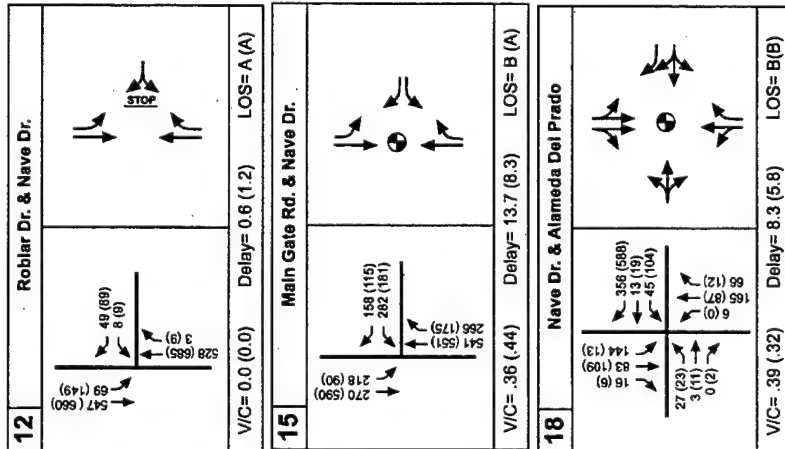
Not to Scale

Intersection locations correspond to those labeled on Figure G-1.

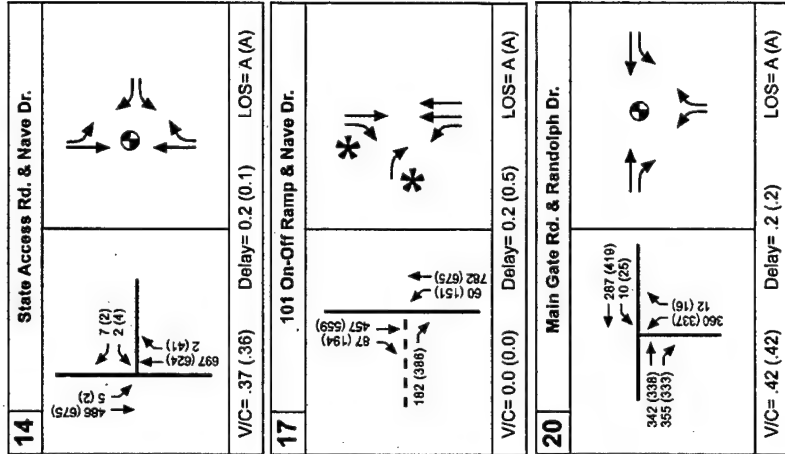
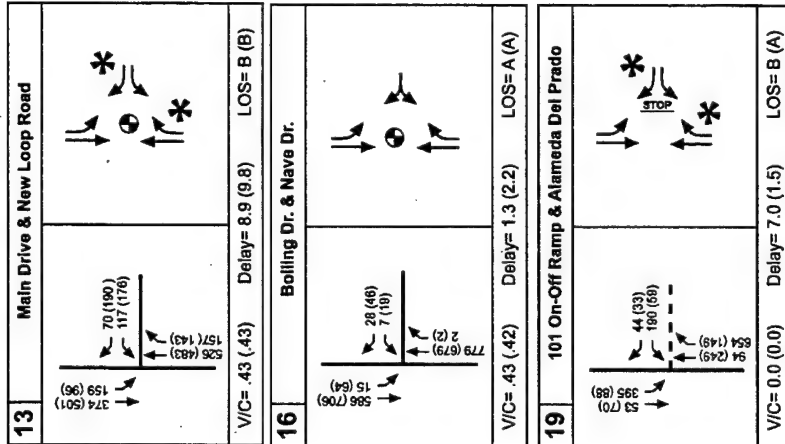
No Action Alternative *Intersection Operations (1-11)*

DOD Housing Facility
 Novato, California

Figure G-8



NOTE: Values presented in this analysis reflect 1994 Highway Capacity Manual analysis techniques.



Key:

114 (158) = 7:45 - 8:45 AM (4:30 - 5:30 PM)

- Traffic Signal
 - Free Right - Turn
 - Freeway Ramps
 - Not Applicable
- N
Not to Scale

Intersection locations correspond to those labeled on Figure G-1.

No Action Alternative Intersection Operations (12-20)

DOD Housing Facility
Novato, California

Figure G-9

**DODHF
Novato**



APPENDIX H

FINAL ENVIRONMENTAL BASELINE SURVEY

EBS ZONE BOUNDARIES

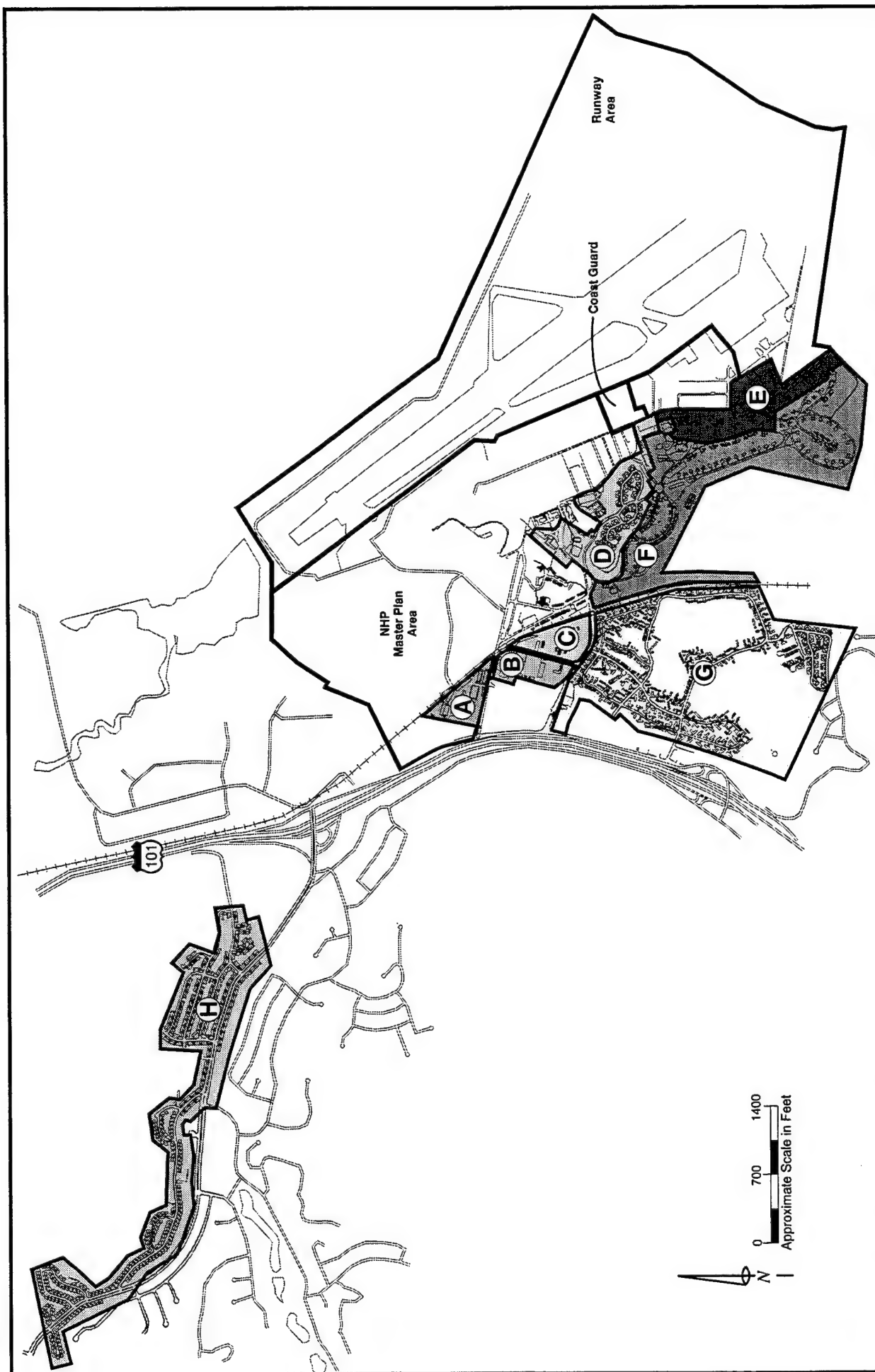
H-2

**DETAILS OF ENVIRONMENTAL ISSUES FOR NON-CERFA
CLEAN PROPERTY**

H-3

APPENDIX H FINAL ENVIRONMENTAL BASELINE SURVEY

Appendix H contains Section 4, Details of Environmental Issues for Non-CERFA Clean Property, from the Final Environmental Baseline Survey dated October 19, 1995. Section 4 summarizes the findings of the EBS process for DODHF Novato including history, geology/hydrogeology, base-specific issues, parcel classification, and an assessment of environmental issues for each zone. The EBS zones correspond roughly to the Reuse Plan and EIS planning areas. Figure H-1 depicts the EBS zone names and boundaries.



EBS Zone Map

DOD Housing Facility
Novato, California

Figure H-1

LEGEND:

	Commissary Triangle		Former Runway and Recreation
	Navy Exchange		Spanish Housing
	Air Force Triangle		Capehart Housing
	Knoll Housing and Recreation		Rafael Village

The Environmental Baseline Survey divides DODHF Novato into zones that correspond generally to the EIS and Reuse Plan planning areas.

Source: U.S. Navy 1995

SECTION 4

RESULTS

Of the initial 129 parcels at DODHF Novato, five parcels have been identified as being outside the Navy property boundaries: Parcels 52, 59, and 62 have been identified as being Army or GSA property; Parcel 123 is the property of Marin County; and Parcel 916 (formerly Parcel 129) is property of the Southern Pacific Railroad. The railroad parcel was redesignated as Parcel 916, an off-site parcel. Of the remaining 124 parcels, 35 have received formal DTSC concurrence as BRAC Area Type 1 and 13 have received verbal DTSC concurrence as BRAC Area Type 1. In addition, five parcels have received verbal DTSC concurrence as BRAC Area Type 2. These parcels currently or formerly stored hazardous substances for over one year; however, no releases were documented or observed during visual inspections.

The remaining 71 parcels have been classified as BRAC Area Type 7, although these parcels are not necessarily impacted by chemicals. For many of the BRAC Area Type 7 parcels, the primary issues involve the unknown extent of either soil and/or groundwater contamination from sites of potential environmental concern (often based on anecdotal information regarding historical use of the parcel) or potential releases from storm and/or sanitary sewers. More evaluation is necessary to determine if these parcels are ready to be reused in their current state. As additional information becomes available either from evaluation of existing data by the BCT or from further investigation and/or sampling, additional parcels may be reclassified.

The information presented in this section summarizes the manner in which the parcels at DODHF Novato were classified using ERM-West's Phase I and II EBS findings. Figure 4-1 is a base map showing parcel boundaries and the buildings currently located within the parcels. To reduce repetition in reporting the results of the EBS, the parcels at DODHF Novato have been divided into eight distinct zones with similar historical usage. Figure 4-1 also depicts the boundaries of the eight zones (Zones A through H). To provide the reader with a better understanding of what buildings and designated outdoor use areas are currently located on the base, two tables have been prepared. Both tables provide the reader with the following information: parcel number, building number and name, and designated outdoor use areas. Table 4-1 organizes the information numerically by building number, and Table 4-2 organizes the information numerically by parcel

TABLE 4-1
Parcels Sorted by Building
DODHF Novato

<i>Building</i>	<i>Parcel</i>	<i>Zone</i>	<i>Description (Current and Former Use)</i>	<i>Status</i>
101	93	D	Electrical transformer vault and switch station.	Constructed between 1932 and 1946.
103	92	D	Officers' quarters.	Demolished after 1991.
104	97	D	Officers' quarters.	Demolished between 1975 and 1981.
105	98	D	Officers' quarters.	Demolished between 1975 and 1981.
106	99	D	Officers' quarters.	Demolished between 1981 and 1985.
108	91	D	Warehouse and supply facility, mess hall.	Demolished between 1975 and 1981.
110	96	D	Officers' quarters.	Demolished between 1981 and 1985.
111	90	D	Vacant. Formerly used as Bachelor Officers' quarters.	Constructed between 1939 and 1942.
113	89	D	Indoor racquetball court. Formerly an outdoor racquetball court.	Constructed in 1994.
115	88	D	Gymnasium, bowling alley.	Constructed in 1945.
191	112	E	Formerly used as an arms and ammunition magazine.	Constructed in 1934.
193	114	E	Recreational equipment storage. Formerly used as a transformer vault and switch station.	Constructed between 1932 and 1946.
196	117	E	Vacant.	Partially demolished. Abandoned.
201	95	F	Bachelor Officers' quarters, housing.	Constructed in 1934.
203	104	F	Community center, library, special services office, and Officers' club.	Constructed between 1930 and 1934.
204	102	F	Swimming pool bathhouse.	Constructed in 1938.
205	102	F	Swimming pool or water supply storage.	Constructed in 1935.
206	103	F	Mess hall, recreation lounge.	Constructed in 1944.
208	102	F	Swimming pool heating system.	Constructed in 1962.
209	102	F	Swimming pool water treatment system.	Constructed in 1934.
225	94	F	Transformer vault.	
227	101	F	Child care center. Formerly used as a Sunday school, personal services, offices, living quarters, and Bachelor Officers' quarters.	Constructed in 1966.
231	106	F	Transformer vault.	
241	109	F	Transformer vault.	
247	113	F	Transformer vault.	
251	110	E	Utility vault (contains one transformer and four switches).	
261	118	F	Transformer vault.	
273	119	F	Transformer vault.	
279	116	F	Transformer vault.	
295	120	F	Transformer vault.	
504	59	D	Base security offices, telephone control station, folk art gallery. Formerly used as a thrift shop, health clinic, HIS House, arts and crafts facility, base communications facility, and telephone exchange. Formerly used by the cryptography unit.	Constructed in 1952.
505	61	D	Utility vault (electrical switch station).	Constructed in 1938.
506	60	D	Utility vault (electrical switch station).	Constructed in 1938. Demolished in the 1980s.
507	58	D	Theatre.	Constructed in 1938.

TABLE 4-1
Parcels Sorted by Building
DODHF Novato

<i>Building</i>	<i>Parcel</i>	<i>Zone</i>	<i>Description (Current and Former Use)</i>	<i>Status</i>
508	57	D	Vacant. Formerly used as Chief Petty Officers' (CPO) club and recreation club. Last occupant, the Air Force Department, departed in 1975.	Constructed in 1939.
509	69	D	Bathrooms. Formerly used as tennis equipment shed, storage shed, and heating facility.	Abandoned.
510	62	D	Vacant. Formerly used as an infirmary, ward, medical clinic, treatment and rehabilitation facility, dental clinic, and surgery clinic.	Constructed in 1942. Abandoned.
513	63	D	Duplex housing unit (Spanish housing).	Constructed in 1934.
518	74	F	Transformer vault.	
519	82	F	Transformer vault.	
522	67	D	Combat center facility, reserve forces operations training.	Demolished.
523	67	D	Heating facility.	Demolished.
525	68	D	Vacant. Formerly used as an infirmary, ward, medical clinic, treatment and rehabilitation facility, supply and equipment warehouse, and hospital linen supply storage.	Constructed in 1941. Abandoned.
526	69	D	Swimming pool.	Demolished.
528	69	D	Vacant. Formerly used as a swimming pool water treatment facility (chlorinator house).	
529	67	D	Medial/dental storage, hospital.	Demolished.
530	69	D	Swimming pool bath house.	Demolished.
531	72	D	Chapel. Formerly used as a day care center.	Constructed in 1942.
532	67	D	Electrical power station, electrical emergency power plant.	Demolished.
534	67	D	Surgical nurse unit, hospital.	Demolished.
537	67	D	OB nurse unit, hospital.	Demolished.
538	67	D	Headquarters.	Demolished.
539	67	D	Water storage tank and locational beacon.	Demolished.
540	67	D	Library, transmitter.	Demolished.
541	67	D	Medical nurse unit, hospital.	Demolished.
542	67	D	Medical nurse unit, hospital.	Demolished.
545	67	D	Headquarters, child care.	Demolished.
546	67	D	Classroom, nursery.	Demolished.
548	67	D	Headquarters, administrative office.	Demolished.
549	67	D	Radio communications facility (contains electronics workshop). Marin Amateur Radio Club (MARS) is current occupant.	Constructed in 1934.
550	56	F	Latrines. Former traffic check house.	Constructed in 1933.
551	66	F	Gas meter facility and electrical switch house.	Constructed in 1933.
552	66	F	Gas meter facility and electrical switch house.	Constructed in 1933.
554	67	D	Quarters.	Demolished.
556	67	D	Storage, medical equipment supply, mess hall.	Demolished.
558	67	D	Bus shelter.	Demolished.
560	67	D	Quarters.	Demolished.
564	83	F	Transformer vault.	
577	84	D	Utility vault and switching station.	Constructed in 1956.

TABLE 4-1

*Parcels Sorted by Building
DODHF Novato*

<i>Building</i>	<i>Parcel</i>	<i>Zone</i>	<i>Description (Current and Former Use)</i>	<i>Status</i>
579	77	F	Youth center and exchange store.	Demolished between 1968 and 1972.
581	78	F	Youth center, school, and Air Force Division headquarters.	Demolished between 1963 and 1968.
583	79	F	Nursing school, thrift shop.	Demolished after 1991.
603	50	D	Chapel and Sunday School. Former location of railroad spur.	Constructed in the 1960s.
801	14	A	NEX storage warehouse.	Constructed in 1943.
802	13	A	NEX storage. Former administrative headquarters for morgue, administrative office for NEX.	Constructed in 1942.
803	12	A	Paper, food and dry product storage warehouse for NEX commissary.	Constructed in 1943.
804	11	A	Commissary. Potentially formerly used as a morgue.	Constructed in 1942.
816	8	A	Auto hobby shop, self-service auto maintenance facility. Historically used as auto, metal, and wood hobby shops.	Constructed in 1943.
820	7	A	Storage (furniture, lawnmowers, appliances). Formerly used as warehouse and equipment maintenance shop.	Constructed in 1943.
821	6	A	Carpentry shop, storage (i.e., furniture, lawn equipment, lumber). (Formerly listed as recreation.) Formerly used as carpentry shop, equipment maintenance shop, and warehouse.	Constructed in 1942.
825	5	A	Dry cleaning/laundry facility.	Demolished between 1975 and 1981.
826	4	A	Vacant. Formerly used as a dry cleaning/laundry facility.	Constructed in 1953. Abandoned.
827	4	A	Vacant. Formerly used as a cold storage facility by NEX.	Constructed in 1953. Abandoned.
828	2	A	Supplies and equipment warehouse.	Constructed in 1942. Demolished between 1985 and 1991.
829	3	A	Vehicle, furniture, and scrap lumber storage. (Formerly listed as auto hobby shop.) Formerly used as a commissary, general store, NEX/retail store, and warehouse for NEX.	Constructed in 1944.
909	27	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1958 and 1963.
910	41	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1985 and 1991.
911	42	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1985 and 1991.
912	43	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1985 and 1991.
913	44	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1985 and 1991.
914	45	C	Thrift shop. Formerly used as a dining hall, mess hall, expansion housing, and personnel support.	Constructed in 1942.
915	46	C	Recreation activities for Boy Scouts of America. Formerly used as a squadron headquarters, lounge, toy store, and housing and personnel support facility.	Constructed in 1942.
916	47	C	Storage for Boy Scouts of America. Formerly used as a supply and equipment room, warehouse, and housing and personnel support facility.	Constructed in 1942.
917	48	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1985 and 1991.
918	49	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1985 and 1991.
926	20	C	Supply warehouse.	Demolished.

TABLE 4-1
Parcels Sorted by Building
DODHF Novato

<i>Building</i>	<i>Parcel</i>	<i>Zone</i>	<i>Description (Current and Former Use)</i>	<i>Status</i>
928	20	C	Gymnasium.	Demolished.
930	26	C	Credit Union. Formerly used as barracks, Air Force headquarters activities, and housing and personnel support activities.	Constructed in 1942.
931	33	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1985 and 1991.
932	34	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1985 and 1991.
933	35	C	Recreation activities for Boy Scouts and Girl Scouts. Formerly used for Air Force Division headquarters, barracks, recreation, expansion housing, and general support.	Constructed in 1942.
934	36	C	Youth center. Formerly used for barracks, recreation, expansion housing, general support, mess hall, and a PX shop.	Constructed in 1942.
935	37	C	Ceramics shop and activity room for the Youth center. Formerly used for Air Force Division headquarters, expansion housing and personnel support.	Constructed between 1939-1942.
936	38	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1968 and 1972.
937	39	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1968 and 1972.
938	40	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1968 and 1972.
950	16	B	Automobile maintenance shop.	Demolished between 1968 and 1972. (Current site of Building 971.)
951	16	B	Automobile maintenance shop.	Demolished between 1968 and 1972. (Current site of Building 971.)
954	19	B	Automobile maintenance shop.	Demolished.
955	19	B	Automobile maintenance shop.	Demolished.
957	19	B	Fueling station, hazardous waste accumulation area.	Demolished.
958	19	B	Paint & dope storage, hazardous materials storage, hazardous waste accumulation area.	Demolished.
960	21	B	Contractor's office and shop. Former automobile maintenance shop and tire shop.	Constructed in 1942.
965	22	B	Contractor's shop and work area. Former automobile maintenance shop.	Constructed in 1958.
969	23	B	PWC shop storage. Former automobile maintenance shop.	Constructed in 1942.
970	29	B	Navy Exchange Service Station.	Constructed in 1974.
971	16	B	Navy Exchange (beauty salon, barber shop, optician, dry cleaner pick-up).	Constructed in 1975.
972	24	B	PWC shops (wood working, metal working), administrative offices, and storage. Former automobile maintenance shop and motor pool.	Constructed in 1942.
973	25	B	Youth recreation center. Former automobile maintenance shop.	Constructed in 1943.
982	55	G	Water supply, water treatment.	Demolished.
983	29	B	Bus shelter.	Demolished between 1958 and 1963. (Current site of Building 970.)
985	29	B	Recreational/multipurpose facility.	Demolished between 1958 and 1963. (Current site of Building 970.)

TABLE 4-1

*Parcels Sorted by Building
DODHF Novato*

<i>Building</i>	<i>Parcel</i>	<i>Zone</i>	<i>Description (Current and Former Use)</i>	<i>Status</i>
986	29	B	Traffic check house.	Demolished between 1958 and 1963. (Current site of Building 970.)
993	55	G	Unknown.	Demolished.
1000	54	G	Housing office, garden and maintenance storage.	Constructed in 1948.
1098	126	I	Former exchange/community center/laundromat (no dry cleaning).	Demolished.
1100	52	G	Main entrance gate to DODHF Novato.	Constructed in 1949.
3131	123	G	Property of Marin County.	
3132	124	G	Sanitary sewer pumping station.	Constructed in 1960.
4041	128	I	Karate instruction/training center. Formerly used as a warehouse, supply & equipment/exchange service outlet.	
Housing	55	G	Capehart housing development.	Constructed in late 1950s and early 1960s.
Housing	65	G	Capehart housing development.	Constructed in late 1950s and early 1960s.
Housing	67	D	Knolls housing. Medical clinic buildings (the 18 buildings listed below) formerly located on this parcel.	
Housing	73	G	Capehart housing development. Farm/residence formerly located on this parcel.	Constructed in late 1950s and early 1960s.
Housing	76	G	Capehart housing development. Hilltop is disturbed.	Constructed in the 1950s and 1960s.
Housing	105	F	Spanish housing development (residential housing).	Constructed in the 1930s.
Housing	125	I	Rafael Village housing development.	Constructed in approximately 1955.
Open space	1	A	Concrete building pad. (No buildings appear in aerial photographs.)	
Open space	17	B	Undeveloped land. (No buildings appear in aerial photographs.)	
Open space	18	B	Parking area. (No buildings appear in aerial photographs.)	
Open space	19	B	Parking area / aboveground storage tank. Former location of Building 957 and Building 958.	
Open space	20	C	Lumber storage.	
Open space	27	C	Lumber storage.	
Open space	28	B	Recreational Vehicle (RV) parking area. (No buildings appear in aerial photographs.)	
Open space	30	C	Landscaped area in Air Force Triangle. (No buildings appear in aerial photographs.)	
Open space	31	C	Parking area in Air Force Triangle. (No buildings appear in aerial photographs.)	
Open space	32	C	Landscaped area in Air Force Triangle. (No buildings appear in aerial photographs.)	
Open space	35	C	Recreation.	
Open space	36	C	Recreation.	
Open space	37	C	Recreation.	
Open space	38	C	Recreation.	
Open space	39	C	Recreation.	
Open space	41	C	Contractor's storage yard.	
Open space	42	C	Contractor's storage yard.	

TABLE 4-1
Parcels Sorted by Building
DODHF Novato

<i>Building</i>	<i>Parcel</i>	<i>Zone</i>	<i>Description (Current and Former Use)</i>	<i>Status</i>
Open space	43	C	Contractor's storage yard.	
Open space	51	D	Parking area. (No buildings appear in aerial photographs.)	
Open space	64	G	Creek.	
Open space	70	D	Tennis Courts.	
Open space	75	F	Undeveloped open space (No buildings appear in aerial photographs).	
Open space	81	F	Parking area (No buildings appear in aerial photographs).	
Open space	86	F	Archeological site at North Circle.	
Open space	108	E	Baseball fields (No buildings appear in historical aerial photographs).	
Open space	115	E	No buildings appear in aerial photographs.	
Open space	121	F	Fill area.	
Open space	122	F	Archeological site, fill area.	
Open space	126	I	Contractor's storage yard.	
Open space	129	H	Railroad track easement, one set of railroad tracks.	
Unnumbered	9	A	Building present in historical aerial photos; no building info.	Demolished between 1950 and 1958.
Unnumbered	10	A	Building present in historical aerial photos; no building info.	Demolished between 1950 and 1958.
Unnumbered	15	A	Building present in aerials; no building info.	Demolished between 1950 and 1958.
Unnumbered	44	C	Construction contractor's trailer.	Temporary.
Unnumbered	53	G	Concrete utility vault for water main.	
Unnumbered	71	D	Amphitheater.	Constructed in 1935.
Unnumbered	80	F	Building present in aerial photographs; no building info.	Demolished between 1972 and 1985.
Unnumbered	85	D	Potentially associated with auto service station formerly located on this parcel.	Demolished between 1950 and 1958.
Unnumbered	85	D	Potentially associated with auto service station formerly located on this parcel.	Demolished between 1950 and 1958.
Unnumbered	85	D	Potentially associated with auto service station formerly located on this parcel.	Demolished between 1950 and 1958.
Unnumbered	87	D	Building present in aerials; no building info.	Demolished between 1981 and 1985.
Unnumbered	100	F	Building present in aerial photographs; no building info.	Demolished between 1950 and 1958.
Unnumbered	107	E	Building present in aerials; no additional building info.	
Unnumbered	111	E	Building present in aerials; no building info.	Demolished between 1968 and 1972.
Unnumbered	127	I	Former housing unit.	Demolished between 1985 and 1991
Unnumbered	129	H	Concrete pad. (Potential former railroad passenger terminal/shelter.)	Demolished.

TABLE 4-2
Buildings Sorted by Parcel
DODHF Novato

Parcel	Building	Zone	Description (Current and Former Use)	Status
1	Open space	A	Concrete building pad. (No buildings appear in aerial photographs.)	
2	828	A	Supplies and equipment warehouse.	Constructed in 1942. Demolished between 1985 and 1991.
3	829	A	Vehicle, furniture, and scrap lumber storage. (Formerly listed as auto hobby shop.) Formerly used as a commissary, general store, NEX/retail store, and warehouse for NEX.	Constructed in 1944.
4	826	A	Vacant. Formerly used as a dry cleaning/laundry facility.	Constructed in 1953. Abandoned.
4	827	A	Vacant. Formerly used as a cold storage facility by NEX.	Constructed in 1953. Abandoned.
5	825	A	Dry cleaning/laundry facility.	Demolished between 1975 and 1981.
6	821	A	Carpentry shop, storage (i.e., furniture, lawn equipment, lumber). (Formerly listed as recreation.) Formerly used as carpentry shop, equipment maintenance shop, and warehouse.	Constructed in 1942.
7	820	A	Storage (furniture, lawnmowers, appliances). Formerly used as warehouse and equipment maintenance shop.	Constructed in 1943.
8	816	A	Auto hobby shop, self-service auto maintenance facility. Historically used as auto, metal, and wood hobby shops.	Constructed in 1943.
9	Unnumbered	A	Building present in historical aerial photos; no building info.	Demolished between 1950 and 1958.
10	Unnumbered	A	Building present in historical aerial photos; no building info.	Demolished between 1950 and 1958.
11	804	A	Commissary. Potentially formerly used as a morgue.	Constructed in 1942.
12	803	A	Paper, food and dry product storage warehouse for NEX commissary.	Constructed in 1943.
13	802	A	NEX storage. Former administrative headquarters for morgue, administrative office for NEX.	Constructed in 1942.
14	801	A	NEX storage warehouse.	Constructed in 1943.
15	Unnumbered	A	Building present in aerials; no building info.	Demolished between 1950 and 1958.
16	950	B	Automobile maintenance shop.	Demolished between 1968 and 1972. (Current site of Building 971.)
16	951	B	Automobile maintenance shop.	Demolished between 1968 and 1972. (Current site of Building 971.)
16	971	B	Navy Exchange (beauty salon, barber shop, optician, dry cleaner pick-up).	Constructed in 1975.
17	Open space	B	Undeveloped land. (No buildings appear in aerial photographs.)	
18	Open space	B	Parking area. (No buildings appear in aerial photographs.)	
19	954	B	Automobile maintenance shop.	Demolished.
19	955	B	Automobile maintenance shop.	Demolished.
19	957	B	Fueling station, hazardous waste accumulation area.	Demolished.
19	958	B	Paint & dope storage, hazardous materials storage, hazardous waste accumulation area.	Demolished.
19	Open space	B	Parking area / aboveground storage tank. Former location of Building 957 and Building 958.	
20	926	C	Supply warehouse.	Demolished.
20	928	C	Gymnasium.	Demolished.
20	Open space	C	Lumber storage.	

TABLE 4-2
Buildings Sorted by Parcel
DODHF Novato

Parcel	Building	Zone	Description (Current and Former Use)	Status
21	960	B	Contractor's office and shop. Former automobile maintenance shop and tire shop.	Constructed in 1942.
22	965	B	Contractor's shop and work area. Former automobile maintenance shop.	Constructed in 1958.
23	969	B	PWC shop storage. Former automobile maintenance shop.	Constructed in 1942.
24	972	B	PWC shops (wood working, metal working), administrative offices, and storage. Former automobile maintenance shop and motor pool.	Constructed in 1942.
25	973	B	Youth recreation center. Former automobile maintenance shop.	Constructed in 1943.
26	930	C	Credit Union. Formerly used as barracks, Air Force headquarters activities, and housing and personnel support activities.	Constructed in 1942.
27	909	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1958 and 1963.
27	Open space	C	Lumber storage	
28	Open space	B	Recreational Vehicle (RV) parking area. (No buildings appear in aerial photographs.)	
29	970	B	Navy Exchange Service Station.	Constructed in 1974.
29	983	B	Bus shelter.	Demolished between 1958 and 1963. (Current site of Building 970.)
29	985	B	Recreational/multipurpose facility.	Demolished between 1958 and 1963. (Current site of Building 970.)
29	986	B	Traffic check house.	Demolished between 1958 and 1963. (Current site of Building 970.)
30	Open space	C	Landscaped area in Air Force Triangle. (No buildings appear in aerial photographs.)	
31	Open space	C	Parking area in Air Force Triangle. (No buildings appear in aerial photographs.)	
32	Open space	C	Landscaped area in Air Force Triangle. (No buildings appear in aerial photographs.)	
33	931	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1985 and 1991.
34	932	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1985 and 1991.
35	933	C	Recreation activities for Boy Scouts and Girl Scouts. Formerly used for Air Force Division headquarters, barracks, recreation, expansion housing, and general support.	Constructed in 1942.
35	Open space	C	Recreation.	
36	934	C	Youth center. Formerly used for barracks, recreation, expansion housing, general support, mess hall, and a PX shop.	Constructed in 1942.
36	Open space	C	Recreation.	
37	935	C	Ceramics shop and activity room for the Youth center. Formerly used for Air Force Division headquarters, expansion housing and personnel support.	Constructed between 1939-1942.
37	Open space	C	Recreation.	
38	936	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1968 and 1972.
38	Open space	C	Recreation.	

TABLE 4-2
Buildings Sorted by Parcel
DODHF Novato

Parcel	Building	Zone	Description (Current and Former Use)	Status
39	937	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1968 and 1972.
39	Open space	C	Recreation.	
40	938	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1968 and 1972.
41	910	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1985 and 1991.
41	Open space	C	Contractor's storage yard	
42	911	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1985 and 1991.
42	Open space	C	Contractor's storage yard	
43	912	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1985 and 1991.
43	Open space	C	Contractor's storage yard	
44	913	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1985 and 1991.
44	Unnumbered	C	Construction contractor's trailer.	Temporary.
45	914	C	Thrift shop. Formerly used as a dining hall, mess hall, expansion housing, and personnel support.	Constructed in 1942.
46	915	C	Recreation activities for Boy Scouts of America. Formerly used as a squadron headquarters, lounge, toy store, and housing and personnel support facility.	Constructed in 1942.
47	916	C	Storage for Boy Scouts of America. Formerly used as a supply and equipment room, warehouse, and housing and personnel support facility.	Constructed in 1942.
48	917	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1985 and 1991.
49	918	C	Air Force Division (classrooms, recreation, quarters, administration).	Demolished between 1985 and 1991.
50	603	D	Chapel and Sunday School. Former location of railroad spur.	Constructed in the 1960s.
51	Open space	D	Parking area. (No buildings appear in aerial photographs.)	
52	1100	G	Main entrance gate to DODHF Novato.	Constructed in 1949.
53	Unnumbered	G	Concrete utility vault for water main.	
54	1000	G	Housing office, garden and maintenance storage.	Constructed in 1948.
55	982	G	Water supply, water treatment.	Demolished.
55	993	G	Unknown.	Demolished.
55	Housing	G	Capehart housing development.	Constructed in late 1950s and early 1960s.
56	550	F	Latrines. Former traffic check house.	Constructed in 1933.
57	508	D	Vacant. Formerly used as Chief Petty Officers' (CPO) club and recreation club. Last occupant, the Air Force Department, departed in 1975.	Constructed in 1939.
58	507	D	Theatre.	Constructed in 1938.

TABLE 4-2
Buildings Sorted by Parcel
DODHF Novato

Parcel	Building	Zone	Description (Current and Former Use)	Status
59	504	D	Base security offices, telephone control station, folk art gallery. Formerly used as a thrift shop, health clinic, HIS House, arts and crafts facility, base communications facility, and telephone exchange. Formerly used by the cryptography unit.	Constructed in 1952.
60	506	D	Utility vault (electrical switch station).	Constructed in 1938. Demolished in the 1980s.
61	505	D	Utility vault (electrical switch station).	Constructed in 1938.
62	510	D	Vacant. Formerly used as an infirmary, ward, medical clinic, treatment and rehabilitation facility, dental clinic, and surgery clinic.	Constructed in 1942. Abandoned.
63	513	D	Duplex housing unit (Spanish housing).	Constructed in 1934.
64	Open space	G	Creek.	
65	Housing	G	Capehart housing development.	Constructed in late 1950s and early 1960s.
66	551	F	Gas meter facility and electrical switch house.	Constructed in 1933.
66	552	F	Gas meter facility and electrical switch house.	Constructed in 1933.
67	549	D	Radio communications facility (contains electronics workshop). Marin Amateur Radio Club (MARS) is current occupant.	Constructed in 1934.
67	Housing	D	Knolls housing. Medical clinic buildings (the 18 buildings listed below) formerly located on this parcel.	
67	522	D	Combat center facility, reserve forces operations training.	Demolished.
67	523	D	Heating facility.	Demolished.
67	529	D	Medial/dental storage, hospital.	Demolished.
67	532	D	Electrical power station, electrical emergency power plant.	Demolished.
67	534	D	Surgical nurse unit, hospital.	Demolished.
67	537	D	OB nurse unit, hospital.	Demolished.
67	538	D	Headquarters.	Demolished.
67	539	D	Water storage tank and locational beacon.	Demolished.
67	540	D	Library, transmitter.	Demolished.
67	541	D	Medical nurse unit, hospital.	Demolished.
67	542	D	Medical nurse unit, hospital.	Demolished.
67	545	D	Headquarters, child care.	Demolished.
67	546	D	Classroom, nursery.	Demolished.
67	548	D	Headquarters, administrative office.	Demolished.
67	554	D	Quarters.	Demolished.
67	556	D	Storage, medical equipment supply, mess hall.	Demolished.
67	558	D	Bus shelter.	Demolished.
67	560	D	Quarters.	Demolished.
68	525	D	Vacant. Formerly used as an infirmary, ward, medical clinic, treatment and rehabilitation facility, supply and equipment warehouse, and hospital linen supply storage.	Constructed in 1941. Abandoned.
69	509	D	Bathrooms. Formerly used as tennis equipment shed, storage shed, and heating facility.	Abandoned.
69	526	D	Swimming pool.	Demolished.

TABLE 4-2
Buildings Sorted by Parcel
DODHF Novato

<i>Parcel</i>	<i>Building</i>	<i>Zone</i>	<i>Description (Current and Former Use)</i>	<i>Status</i>
69	528	D	Vacant. Formerly used as a swimming pool water treatment facility (chlorinator house).	
69	530	D	Swimming pool bath house.	Demolished.
70	Open space	D	Tennis Courts.	
71	Unnumbered	D	Amphitheater.	Constructed in 1935.
72	531	D	Chapel. Formerly used as a day care center.	Constructed in 1942.
73	Housing	G	Capehart housing development. Farm/residence formerly located on this parcel.	Constructed in late 1950s and early 1960s.
74	518	F	Transformer vault.	
75	Open space	F	Undeveloped open space (No buildings appear in aerial photographs).	
76	Housing	G	Capehart housing development. Hilltop is disturbed.	Constructed in the 1950s and 1960s.
77	579	F	Youth center and exchange store.	Demolished between 1968 and 1972.
78	581	F	Youth center, school, and Air Force Division headquarters.	Demolished between 1963 and 1968.
79	583	F	Nursing school, thrift shop.	Demolished after 1991.
80	Unnumbered	F	Building present in aerial photographs; no building info.	Demolished between 1972 and 1985.
81	Open space	F	Parking area (No buildings appear in aerial photographs)	
82	519	F	Transformer vault.	
83	564	F	Transformer vault.	
84	577	D	Utility vault and switching station.	Constructed in 1956.
85	Unnumbered	D	Potentially associated with auto service station formerly located on this parcel.	Demolished between 1950 and 1958.
85	Unnumbered	D	Potentially associated with auto service station formerly located on this parcel.	Demolished between 1950 and 1958.
85	Unnumbered	D	Potentially associated with auto service station formerly located on this parcel.	Demolished between 1950 and 1958.
86	Open space	F	Archeological site at North Circle.	
87	Unnumbered	D	Building present in aerials; no building info.	Demolished between 1981 and 1985.
88	115	D	Gymnasium, bowling alley.	Constructed in 1945.
89	113	D	Indoor racquetball court. Formerly an outdoor racquetball court.	Constructed in 1994.
90	111	D	Vacant. Formerly used as Bachelor Officers' quarters.	Constructed between 1939 and 1942.
91	108	D	Warehouse and supply facility, mess hall.	Demolished between 1975 and 1981.
92	103	D	Officers' quarters.	Demolished after 1991.
93	101	D	Electrical transformer vault and switch station.	Constructed between 1932 and 1946.
94	225	F	Transformer vault.	
95	201	F	Bachelor Officers' quarters, housing.	Constructed in 1934.
96	110	D	Officers' quarters.	Demolished between 1981 and 1985.
97	104	D	Officers' quarters.	Demolished between 1975 and 1981.
98	105	D	Officers' quarters.	Demolished between 1975 and 1981.
99	106	D	Officers' quarters.	Demolished between 1981 and 1985.
100	Unnumbered	F	Building present in aerial photographs; no building info.	Demolished between 1950 and 1958.
101	227	F	Child care center. Formerly used as a Sunday school, personal services, offices, living quarters, and Bachelor Officers' quarters.	Constructed in 1966.

TABLE 4-2
Buildings Sorted by Parcel
DODHF Novato

<i>Parcel</i>	<i>Building</i>	<i>Zone</i>	<i>Description (Current and Former Use)</i>	<i>Status</i>
102	204	F	Swimming pool bathhouse.	Constructed in 1938.
102	205	F	Swimming pool or water supply storage.	Constructed in 1935.
102	208	F	Swimming pool heating system.	Constructed in 1962.
102	209	F	Swimming pool water treatment system.	Constructed in 1934.
103	206	F	Mess hall, recreation lounge.	Constructed in 1944.
104	203	F	Community center, library, special services office, and Officers' club.	Constructed between 1930 and 1934.
105	Housing	F	Spanish housing development (residential housing).	Constructed in the 1930s.
106	231	F	Transformer vault.	
107	Unnumbered	E	Building present in aerials; no additional building info.	
108	Open space	E	Baseball fields (No buildings appear in historical aerial photographs).	
109	241	F	Transformer vault.	
110	251	E	Utility vault (contains one transformer and four switches).	
111	Unnumbered	E	Building present in aerials; no building info.	Demolished between 1968 and 1972.
112	191	E	Formerly used as an arms and ammunition magazine.	Constructed in 1934.
113	247	F	Transformer vault.	
114	193	E	Recreational equipment storage. Formerly used as a transformer vault and switch station.	Constructed between 1932 and 1946.
115	Open space	E	No buildings appear in aerial photographs.	
116	279	F	Transformer vault.	
117	196	E	Vacant.	Partially demolished. Abandoned.
118	261	F	Transformer vault.	
119	273	F	Transformer vault.	
120	295	F	Transformer vault.	
121	Open space	F	Fill area.	
122	Open space	F	Archeological site, fill area.	
123	3131	G	Property of Marin County.	
124	3132	G	Sanitary sewer pumping station.	Constructed in 1960.
125	Housing	I	Rafael Village housing development.	Constructed in approximately 1955.
126	1098	I	Former exchange/community center/laundromat (no dry cleaning).	Demolished.
126	Open space	I	Contractor's storage yard.	
127	Unnumbered	I	Former housing unit.	Demolished between 1985 and 1991.
128	4041	I	Karate instruction/training center. Formerly used as a warehouse, supply & equipment/exchange service outlet.	
129	Open space	H	Railroad track easement, one set of railroad tracks.	
129	Unnumbered	H	Concrete pad. (Potential former railroad passenger terminal/shelter.)	Demolished.

number. Both tables include a column indicating in which zone the building is located.

This section consists of five subsections: history, geology/hydrogeology, base-specific issues, parcel classification, and zone assessment summaries. The history of land use on the base property is provided first. This historical write-up is followed by descriptions of local geologic/hydrogeologic conditions, relevant base-specific information, and an overview of the parcel classification process. The final subsection, zone assessment summaries, describes the manner in which information in the summaries is organized. This subsection is immediately followed by the eight zone assessment summaries; each of the eight summaries begins on a new page.

History

This subsection was compiled using information from "Master Plan-Department of Defense Housing Facility, Novato, California," Engineering Field Activity, West (September 1986), "National Register of Historic Places Evaluation, Hamilton Army Air Field Historic District, Marin County," Par Environmental Services, Inc. (October 1993), and the "U.S. Army CERFA Report," Earth Technology Corporation (November 1993).

Prior to 1934, the area now occupied by DODHF Novato was undeveloped property belonging to the County of Marin. The United States Army Air Corps established the original installation in Novato in 1934 on lands granted to the federal government by the county. The installation was transferred to the United States Air Force in the 1940s, at which time it became Hamilton Air Force Base (AFB). The primary mission of the base was to provide training for fighter and bomber pilots. Included in these activities were the repair and maintenance of various aircraft, as well as the processing of combat troops. The base sustained continued growth with the addition of housing developments in the 1950s and 1960s.

In 1974, Hamilton AFB was officially deactivated and the U.S. Navy was granted the housing portions of the base. These areas consisted of housing developments, personnel support, and recreation areas. The Navy property is divided into several areas by geographic location and by the road system. These areas are referred to as Spanish Housing, Capehart Housing, Commissary Triangle, Air Force Triangle, and Rafael Village (a housing development situated approximately one mile northwest of the main base and across Highway 101).

Throughout their history, the housing portions of DODHF Novato have maintained their intended uses. Rafael Village was undeveloped property until military housing was constructed in the 1950s. Capehart Housing was developed in stages, although the majority of the area was constructed in the 1960s. It, too, was built on previously undeveloped property. Spanish Housing consists of the original base housing units constructed in the 1930s. Located at the north end of Spanish Housing is an area designated as Knolls Housing. This area was developed in the 1980s on what was formerly the site of medical support facilities and the base communications center. The former buildings were demolished and the hilltop was graded to the level of the surrounding Spanish Housing area. Fill from this project was placed in various locations on the base.

Personnel support facilities are located within Air Force Triangle, Commissary Triangle, and an area near the two known as the Public Works area. The Air Force Triangle area was originally designated as housing for enlisted personnel. Along with several barracks, larger buildings were utilized as mess halls. This area has also been used as headquarters for military divisions, exchange and commissary purposes, education and day care facilities, and recreational facilities. Buildings within the Commissary Triangle have been used as vehicle maintenance shops, storage warehouses, laundry facilities, and the base Commissary. The Public Works area has been used throughout time for vehicle-related repair, storage, and fueling activities.

Recreational areas are included in the Navy property and consist of indoor and outdoor facilities. Within the three housing developments are designated playing fields and playgrounds. The northern portion of Spanish Housing contains such recreational facilities as a gymnasium/bowling alley, racquet ball courts, a swimming pool, and tennis courts. Air Force Triangle currently contains playgrounds for the day care center, activity areas for Boy and Girl Scouts, and a skateboard ramp.

Geology/Hydrogeology

This subsection was compiled using information from "U.S. Army CERFA Report" (Earth Technology Corporation, November 1, 1993), "UST Removal and Preliminary Investigation" (PRC Environmental Management, Inc., November 19, 1992), and "Soil and Groundwater Investigation Report" for Shell Oil Company's 1390 South Novato Boulevard site (Dames and Moore, March 1, 1990).

DODHF Novato is located in a low-lying area on the northwestern edge of San Francisco Bay. The Coast Range Mountains border Novato on the west and include the upper portion of the Franciscan Assemblage, a Cretaceous sequence of marine sandstones and interbedded shales. The Franciscan Assemblage is locally faulted, folded, and metamorphosed.

The regional groundwater flow is eastward from the hills and generally toward the San Pablo Bay. Variations from this regional gradient have been documented in the vicinity of portions of DODHF Novato, with the gradient altered toward surface water such as creeks and sloughs. Gradients may also be locally affected by groundwater extraction and/or injection.

Depth to groundwater ranges from three feet below ground surface (BGS) in the regions closer to the bay to approximately 12 feet bgs along the valley floors. Data were not available for knolls and hillsides located within DODHF Novato. However, depth to groundwater is likely to be significantly greater at higher elevations.

Groundwater in the vicinity of DODHF Novato is not utilized as a drinking source. The clays present are relatively impermeable and are not favorable for a productive aquifer. The groundwater in the lower regions are also likely to be brackish due to the influence of the nearby bay.

Base-Specific Issues

The following issues at DODHF Novato had an adverse affect on parcel classification:

- The Novato Fire Department has been contracted since the mid-1970s to service the Navy-occupied property. The Fire Department's record-keeping system maintains limited information on reported incidents (i.e., electrical, wash down, chest pains, etc.). ERM-West's review of the accessible files revealed minimal site-specific data. The information disclosed procedures that were consistent with assumptions concerning potential storm sewer contamination. Records described instances in which spilled gasoline was "washed down" into storm sewers.
- Several instances of unconventional demolition of buildings, either as the result of being burned to the ground for Novato Fire Department training purposes or exploded for movie production, occurred at DODHF Novato. Parcels on which these forms of

demolition took place were considered potential sources of contaminant release.

- Due to the deactivation of the Air Force Base in the mid-1970s, very few long time employees were available for interview. This was compounded by the transient nature of many positions within the military. Interviews were obtained from several employees with 20+ years service at the base, an employee with 5+ years, and with Novato Fire Officials who had been involved with the base throughout the duration of the Fire Department's contract.
- As stated in Section 2, Environmental Department records relating to lead, medical/biohazardous wastes, ordnance, radioactive materials/mixed wastes, and oil/water separator issues were not available for review. However, instances where information was obtained from other sources was documented and utilized in parcel classifications (i.e., ordnance).

Parcel Classification

A major goal of the project was to classify the various parcels according to the predefined categories (see Section 3, Parcel Classification, for a description of these categories.) Thus, a database was designed to facilitate collection and organization of the information by parcel for quick review. To classify each parcel, all data gathered for the parcel during this investigation were extracted from the database and reviewed.

The bibliography, a printout of which is provided in Appendix B, has also been developed in an electronic database format to allow for easy entry and retrieval of bibliographic information. The bibliography includes all files reviewed during the project even if they yielded no useful information. By contrast, only references yielding useful information were entered into the actual project database.

Based on the 60-year period of review, each parcel was placed in at least one of the seven categories described in Section 3. Table 4-3, Summary of Parcel Classifications, lists each of the parcels (by zone), its classification number, and the reason for the classification. Information is grouped by the general headings on Table 4-3, "Chemical Storage and Use," "Drains," "Contamination Issues," and "Missing Data." Information about the storage, release, or potential contamination migration of hazardous substances and petroleum products or its derivatives was used to classify the parcels. The column under the "Missing Data" heading contains information collected

TABLE 4-3

Summary EBS Data and Parcel Classifications by Zone
DODHF Novato

Parcel #	BRAC Classification	Chemical Storage and Use					Drainage	Contamination Issues										Missing Data	Comments										
		Chemical Storage	Hazardous Waste Generation and/or Storage	Radioactive Materials	Oil-filled Transformer/Switch (not PCB tested)	PCB-Contaminated Transformer	Ordinance Storage or Use	Current, Former, and/or Potential UST	Current or Former AST	Fuel Lines	Potentially Contaminated Storm Drain	Potentially Contaminated Sanitary Sewer	Lead Release Issues (Paint, Shooting Range, etc.)	Frangible Asbestos	Pesticide Use and/or Storage (Non-Routine)	Known or Suspected UST; No Additional Information	Known Contamination, Not Under Investigation	Investigation Currently Underway		Potential Contamination Migration Onto Parcel	Documented Spills/Incidents (No Approved Cleanup)	Documented Spills/Incidents (Approved Cleanup)	Significant Staining Observed	Unconventional Building Demolition	Potential Historical Adverse Use	No or Incomplete Lead Paint Survey	No or Incomplete Asbestos Survey	No or Incomplete Radon Survey	Other (See Comments)
ZONE A																													
1	7	✓	✓		✓						✓											✓			×	×		Inactive transformer	
2	7										✓											✓			×	×		Supply/equipment warehouse	
3	7				✓						✓														×	✓		Supply/equipment warehouse	
4	7	✓			✓		✓				✓				✓								✓	×	✓			Former dry cleaner, USTs	
5	7	✓									✓												✓	×	×			Former dry cleaner	
6	7	✓	✓								✓												✓	×	✓			Former maintenance shop	
7	7	✓	✓								✓												✓	×	✓			Former maint. shop & equip. whse	
8	7	✓	✓		✓			✓			✓	✓									✓		✓	×	✓			Workshop & auto maintenance	
9	7	✓									✓														×	×		Bldg disappeared in 1950s	
10	1																							×	×			Bldg disappeared in 1950s	
11	7	✓			✓		✓														✓			×	✓			AST; Fmr supply warehouse; morgue	
12	7	✓									✓													×	✓			Former supply warehouse	
13	1										✓													×	✓			Parcel 11 (morgue) used for cold storage	
14	7	✓									✓	✓							✓		✓			×	✓			Former warehouse	
15	7										✓	✓													×	×			
ZONE B																													
16	7	✓	✓		✓						✓	✓						✓					✓	×	✓			Dry cleaner; Former auto maintenance	
17	7										✓							✓						×	×				
18	7	✓			✓						✓	✓						✓						×	×				
19	7	✓	✓				✓										✓	✓					✓	×	×			AST; Former auto maintenance/LUST	
21	7	✓	✓								✓							✓			✓		✓	×				Former auto maintenance shop	
22	7	✓	✓								✓			✓				✓					✓	×				Former auto maintenance shop	
23	7	✓	✓								✓			✓				✓					✓	×				Former auto maintenance shop	
24	7	✓	✓				✓				✓						✓	✓			✓		✓	×				Former auto maintenance/LUST	
25	7	✓	✓								✓							✓					✓	×	✓			Former auto maintenance	
28	7										✓	✓						✓						×	×				
29	7	✓	✓		✓		✓				✓	✓						✓	✓				✓	×	✓			3 USTs (1 LUST), 1 O/W Separator	
ZONE C																													
20	7																	✓						×	×			Former supply warehouse	
26	1																							×	✓				

TABLE 4-3

Summary EBS Data and Parcel Classifications by Zone
DODHF Novato

Parcel #	BRAC Classification	Chemical Storage and Use										Drainage	Contamination Issues										Missing Data		Comments				
		Chemical Storage	Hazardous Waste Generation and/or Storage	Radioactive Materials	Oil-filled Transformer/Switch (not PCB tested)	PCB-Contaminated Transformer	Ordnance Storage or Use	Current, Former, and/or Potential UST	Current or Former AST	Fuel Lines	Potentially Contaminated Storm Drain		Potentially Contaminated Sanitary Sewer	Lead Release Issues (Paint, Shooting Range, etc.)	Frangible Asbestos	Pesticide Use and/or Storage (Non-Routine)	Known or Suspected UST; No Additional Information	Known Contamination, Not Under Investigation	Investigation Currently Underway	Potential Contamination Migration Onto Parcel	Documented Spills/Incidents (No Approved Cleanup)	Documented Spills/Incidents (Approved Cleanup)	Significant Staining Observed	Unconventional Building Demolition		Potential Historical Adverse Use	No or Incomplete Lead Paint Survey	No or Incomplete Asbestos Survey	No or Incomplete Radon Survey
27	1																								X	X			
30	7																	✓							X	X			
31	1																								X	X		Parking lot	
32	1				✓																				X	X	✓	Makeshift culvert	
33	1																								X	X			
34	1																								X	X			
35	1																								X	✓			
36	1																								✓	✓		Day care	
37	1																								✓	✓		Day care	
38	1																								X	X			
39	1																								X	X			
40	1																								X	X			
41	1																								X	X			
42	7																								✓				
43	7	✓																							✓	✓	✓	Makeshift culvert	
44	1																								X	X			
45	1																								X	✓			
46	1																								X	✓			
47	1																								X	✓		Former warehouse	
48	1																								X	X			
49	1																								X	X			
ZONE D																													
50	7	✓												✓											✓	X	✓		Former RR spur ran through parcel
51	1																								X	X			
57	1																								X	✓			
58	7										✓														X	✓		San. sewer originates at hospital	
59	7	✓						✓			✓			✓											X	✓		UST in plans: Army Property	
60	1																								X	✓			
61	7				✓						✓														X	✓			
62	7				✓			✓						✓										✓	X	✓		Former dental clinic; Army Property	
63	7										✓														✓	✓		Housing	
67	7	✓			✓			✓	✓		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Housing; Former Medical Clinic/USTs	

TABLE 4-3

Summary EBS Data and Parcel Classifications by Zone
DODHF Novato

Parcel #	BRAC Classification	Chemical Storage and Use								Drainage	Contamination Issues										Missing Data		Comments						
		Chemical Storage	Hazardous Waste Generation and/or Storage	Radioactive Materials	Oil-filled Transformer/Switch (not PCB tested)	PCB-Contaminated Transformer	Ordinance Storage or Use	Current, Former, and/or Potential UST	Current or Former AST		Fuel Lines	Potentially Contaminated Storm Drain	Potentially Contaminated Sanitary Sewer	Lead Release Issues (Paint, Shooting Range, etc.)	Frangible Asbestos	Pesticide Use and/or Storage (Non-Routine)	Known or Suspected UST; No Additional Information	Known Contamination, Not Under Investigation	Investigation Currently Underway	Potential Contamination Migration Onto Parcel	Documented Spills/Incidents (No Approved Cleanup)	Documented Spills/Incidents (Approved Cleanup)		Significant Staining Observed	Unconventional Building Demolition	Potential Historical Adverse Use	No or Incomplete Lead Paint Survey	No or Incomplete Asbestos Survey	No or Incomplete Radon Survey
68	7										✓								✓						✓	X	✓		Former whse.; X-ray/spill resp. signs
69	2	✓			✓																					X	X		Stored pool treatment chemicals
70	7				✓						✓															X	X		
71	7																	✓								X	X	✓	Two empty 5-gal MEK containers
72	7	✓									✓															✓	✓		Day care; patching & sewer
84	7				✓													✓								X	✓		Utility vault
85	7							✓			✓						✓	✓								X	X		2 USTs removed (1 LUST)
87	7										✓							✓								X	X		No use info for previous building
88	7	✓			✓		✓				✓					✓		✓								X	✓		UST (removal uncertain)
89	7										✓							✓								X	X		
90	7										✓															X	✓	✓	Washrack sign
91	7										✓															X	X		
92	7										✓											✓				X	X	✓	New asphalt
93	7				✓						✓															X	✓		Utility vault
96	7																						✓			X	X		
97	7																					✓	✓	✓		X	X		New gravel
98	7																					✓	✓			X	X		
99	7																					✓	✓			X	X		
ZONE E																													
107	7										✓															X	X		Baseball diamond
108	7				✓						✓															X	X	✓	B-ball diamond; Possible contam. fill
110	7				✓						✓															X	✓		Utility vault
111	7									✓	✓							✓								X	X		
112	7							✓			✓							✓								X	✓		Off-site cont.; Former ord. stor.
114	7							✓										✓								X	✓		Off-site cont.; Former ord. stor.
115	7		✓		✓						✓	✓						✓								X	X		Waste oil container and sheen
117	1																									X	✓		Former golf shed; relocated
ZONE F																													
56	7																		✓							X	✓		Picnic area latrine
66	7	✓	✓		✓																					X	✓		PCB transformer storage
74	1				✓																					X	✓		
75	1																									X	X		

TABLE 4-3
Summary EBS Data and Parcel Classifications by Zone
DODHF Novato

Parcel #	BRAC Classification	Chemical Storage and Use								Drainage	Contamination Issues												Missing Data	Comments								
		Chemical Storage	Hazardous Waste Generation and/or Storage	Radioactive Materials	Oil-filled Transformer/Switch (not PCB tested)	PCB-Contaminated Transformer	Ordnance Storage or Use	Current, Former, and/or Potential UST	Current or Former AST		Fuel Lines	Potentially Contaminated Storm Drain	Potentially Contaminated Sanitary Sewer	Lead Release Issues (Paint, Shooting Range, etc.)	Friable Asbestos	Pesticide Use and/or Storage (Non-Routine)	Known or Suspected UST; No Additional Information	Known Contamination, Not Under Investigation	Investigation Currently Underway	Potential Contamination Migration Onto Parcel	Documented Spills/Incidents (No Approved Cleanup)	Documented Spills/Incidents (Approved Cleanup)			Significant Staining Observed	Unconventional Building Demolition	Potential Historical Adverse Use	No or Incomplete Lead Paint Survey	No or Incomplete Asbestos Survey	No or Incomplete Radon Survey	Other (See Comments)	
77	1																								X	X		Minor building debris				
78	1																								X	X		Minor building debris				
79	1																								X	X		Concrete pad from building demo.				
80	7										✓														X	X						
81	7										✓														X	X		Parking lot				
82	1				✓																				X	✓		Utility vault				
83	2	✓			✓																				X	✓		Utility vault; Inactive transformer				
86	7										✓							✓							X	X		Indian ruins				
84	1				✓																				X	✓		Utility vault				
95	7						✓								✓										X	✓		Possible UST fill pipes				
100	1																								X	X						
101	1	✓																							✓	✓		Day care				
102	2	✓																							X	✓		Stored pool treatment chemicals				
103	1																								X	✓						
104	7				✓		✓								✓										X	✓						
105	7	✓			✓						✓				✓			✓						✓	✓	✓	✓	✓	Possible contam. fill; Former RR spur			
106	1				✓																				X	✓		Utility vault				
109	1				✓																				X	✓		Utility vault				
113	1				✓																				X	✓		Utility vault				
116	2	✓			✓																				X	✓		Utility vault; Inactive transformer				
118	1				✓																				X	✓		Utility vault				
119	1				✓																				X	✓		Utility vault				
120	1				✓																				X	✓		Utility vault				
121	7																								X	X	✓	Potential contaminated fill				
122	7																								X	X	✓	Indian ruins; Potential contam. fill				
ZONE G																																
52	1																								X	✓		Army Property				
53	1																								X	X						
54	7	✓			✓							✓													X							
55	7	✓								✓								✓							X	✓		Former water trtmnt - chlorine stor.				
64	7									✓															X	X	✓	Empty 55-gal drum in creek				
65	7				✓													✓							✓	✓		Housing				

TABLE 4-3

*Summary EBS Data and Parcel Classifications by Zone
DODHF Novato*

Parcel #	BRAC Classification	Chemical Storage and Use								Drain- age	Contamination Issues												Missing Data	Comments					
		Chemical Storage	Hazardous Waste Generation and/or Storage	Radioactive Materials	Oil-filled Transformer/Switch (not PCB tested)	PCB-Contaminated Transformer	Ordnance Storage or Use	Current, Former, and/or Potential UST	Current or Former AST		Fuel Lines	Potentially Contaminated Storm Drain	Potentially Contaminated Sanitary Sewer	Lead Release Issues (Paint, Shooting Range, etc.)	Friable Asbestos	Pesticide Use and/or Storage (Non-Routine)	Known or Suspected UST; No Additional Information	Known Contamination, Not Under Investigation	Investigation Currently Underway	Potential Contamination Migration Onto Parcel	Documented Spills/Incidents (No Approved Cleanup)	Documented Spills/Incidents (Approved Cleanup)			Significant Staining Observed	Unconventional Building Demolition	Potential Historical Adverse Use	No or Incomplete Lead Paint Survey	No or Incomplete Asbestos Survey
73	1			✓																					X	✓		Housing	
76	1			✓																					✓	✓		Housing	
123	7																								X	X		Water tank; Marin County Property	
124	2	✓						✓																	X	X		Diesel gen (san. sewer pump strn.)	
ZONE H																													
125	1			✓																					✓	✓		Housing	
126	7	✓	✓											✓											X	X		Landscaping storage yard	
127	1																								X	X		House disappeared	
128	1																								X	✓		Former warehouse	

 indicates written agency concurrence on BRAC classification

 indicates verbal agency concurrence on BRAC classification

✓ indicates that parcel is affected by this criterion

 A blank box indicates that the parcel is not affected by this criterion

X in Missing Data column indicates that the criterion is not applicable

Note:

To become consistent with other Bay Area Navy Bases, the practice of considering construction debris and minor staining as issues of environmental concern was ended after the completion of a limited EBS for DODHF Novato. This resulted in the removal of checkmarks from Table 4-3 and in some cases the changing of parcel Area Type classifications between the limited and basewide versions of the EBS.

during the survey that might limit the ability of the parcel to be transferred without constraints, in accordance with DOD policy. A description of each of the column titles is given below.¹⁸

The symbols used to identify information on the table include a check mark (✓), a "blank," and an "X." Boxes marked with a check mark indicate that the information in the column title has an environmental effect on the parcel. Conversely, a blank box indicates the parcel is not affected. Information marked with an "X" in the "Missing Data" column title indicates that the criterion does not apply. For example, an asbestos survey would not be required for a site containing no structure.

Chemical Storage and Use

The column titles that fall under this general heading capture the different types of chemical usage that affect parcel classification.

Chemical Storage. A check mark indicates that any quantity of a hazardous substance or any petroleum product or its derivatives, including aviation fuel and motor oil, had been or is currently being stored on the parcel. Incidental storage of household-type cleaning chemicals and consumer office products was excluded. Chemical storage for longer than one year would preclude a parcel from being CERFA-eligible.

Hazardous Waste Generation and/or Storage. A check mark indicates that hazardous wastes have been stored or generated on a parcel at any time. Such storage for more than a year would preclude a parcel from being CERFA-eligible. Because they generated waste oil, waste coolant, and used oil filters, it was assumed that current and former auto maintenance shops may have generated hazardous wastes.

Radioactive Materials. In addition to review of on-site records, EFAWEST requested that NAVSEADET RASO and NEHC search for information on known and potential uses of radioactive materials at the base. NAVSEADET RASO and NEHC concurrence is required prior to nomination for CERFA or for lease or transfer of any parcel. A check mark indicates that radioactive materials are currently or were formerly used, stored, or disposed of on the parcel. This would

¹⁸ To become consistent with other Bay Area Navy Bases, the practice of considering construction debris and minor staining as issues of environmental concern was ended after the completion of a limited EBS for DODHF Novato. This resulted in the removal of checkmarks from Table 4-3 and in some cases the changing of parcel Area Type classifications between the limited and basewide versions of the EBS.

preclude a parcel from being CERFA-eligible. A "blank" in this column indicates that no information regarding the use, storage, or disposal of radioactive materials was identified for the subject parcel, and that NAVSEADET RASO and NEHC concurrence has been received.

Oil-filled Transformer or Switch (not PCB tested or determined to not contain PCBs). A check mark indicates that an oil-filled transformer or switch is currently or has formerly been located on the parcel, but the PCB content is unknown because it has not been tested, or it has been tested and determined to not contain detectable concentrations of PCBs. An operating transformer with no evidence of leakage would not preclude CERFA-eligibility. Per DTSC guidance, an inactive oil-filled transformer that is not intended for future use constitutes chemical storage. Disclosure of the presence of transformers to a prospective tenant would be required under DOD guidance on the finding of suitability to lease or transfer.

PCB-Containing Transformer or Switch. A check mark indicates that a transformer whose PCB fluid concentration is greater than five ppm is currently or formerly located on the parcel. An operating PCB-containing transformer with no evidence of leakage would not preclude CERFA-eligibility. Disclosure of the presence of the transformer to a prospective tenant would be required under DOD guidance on the finding of suitability to lease or transfer.

Ordnance Storage or Use. A check mark indicates that ordnance (weapons or ammunition) are currently or have been formerly stored or used on the parcel. Storage of ordnance in and of itself is not considered to have an environmental impact on the parcels and, therefore, would not preclude CERFA-eligibility. Ordnance disposed of through incineration or placed in a landfill would preclude a parcel from being CERFA-eligible.

Ordnance storage is suspected to have occurred on some areas of DODHF, generally those areas closer to the airfield. This is based on historic building lists that described the building construction type, the building number, and a brief description of the use. No one who was interviewed had any knowledge of the types or quantities of ordnance stored at DODHF Novato. It is likely, however, that any ordnance, if stored on DODHF Novato, would be packaged and unopened during storage. Given that building lists were the only source of information regarding ordnance, more specific information regarding the type and/or handling procedures was not obtained through the EBS process and may not exist.

Current or Former Underground Storage Tank. A check mark indicates that USTs containing hazardous substances were used (past or present) on the parcel and would preclude a parcel from being CERFA-eligible. Figure 4-1 depicts DODHF Novato's current and former UST locations.

Current or Former Aboveground Storage Tank. A check mark indicates that ASTs containing hazardous substances were used (past or present) on the parcel and would preclude a parcel from being CERFA-eligible.

Fuel Lines. A check mark indicates that underground or above ground piping used for fuel delivery is located on the parcel and would preclude a parcel from being CERFA-eligible. No fuel lines, other than localized lines in the immediate vicinity of (and therefore considered to be part of the equipment associated with) storage tanks, were determined to be present on DODHF Novato property during the EBS efforts.

Drainage

Drain lines and drainage channels are described below. A check mark in any of these columns would preclude a parcel from being CERFA-eligible.

Potentially Contaminated Storm Drain. A check mark indicates that there was a potential for chemicals or industrial wastewater to have been discharged to a storm drain that passes through the parcel. Drainage piping can leak from cracks or joints, or piping may corrode, releasing chemicals into the surrounding soil. This would preclude a parcel from being CERFA-eligible. A check mark could place the parcel into BRAC Area Type 7. After further evaluation and/or sampling, however, the parcel may be reclassified.

Potentially Contaminated Sanitary Sewer. A check mark indicates that there was a potential for chemicals or industrial wastewater to have been discharged to a sanitary sewer that passes through the parcel. Sewer piping may leak from the joints or piping may corrode, releasing chemicals into the surrounding soil. This would preclude a parcel from being CERFA-eligible. A check mark could place the parcel into BRAC Area Type 7. After further evaluation and/or sampling, however, the parcel may be reclassified.

Contamination Issues

When contamination was either suspected or known to have occurred on the parcel or to have affected the parcel, a notation was made in the appropriate column heading within this category. A check mark in any of these columns indicates that additional investigation is required for the parcel.

Lead Release Issues (Paint, Shooting Ranges). A check mark indicates that compounds containing lead had been released on the parcel. This may preclude a parcel from being CERFA-eligible.

Following draft DOD policy,¹⁹ lead-based paint was noted both for parcels containing housing, and for all other parcels that do not contain housing. The presence of lead-based paint would not preclude CERFA-eligibility. Disclosure of the presence of the lead-based paint to a prospective tenant would be required under DOD guidance on the finding of suitability to lease or transfer.

Friable Asbestos. A check mark indicates that asbestos was determined to be friable (easily crumbled or pulverized with hand pressure) based on the results of an asbestos survey. Note that ERM-West did not survey asbestos as part of this work. The presence of friable asbestos within a structure would not preclude a parcel from being CERFA-eligible. A check mark could place the parcel into BRAC Area Type 7. After further evaluation and/or sampling, the parcel may be reclassified.

Non-Routine Pesticide Use. A check mark indicates that pesticides/herbicides/fungicides were used or stored on the parcel in a more than routine manner. This would preclude a parcel from being CERFA-eligible and may require further evaluation and/or sampling in order to ensure protection of human health and the environment. Potential adverse impacts from pesticide application take into account historic land use. Routine, licensed pesticide application was not considered to be an adverse affect on the parcel.

Known or Suspected UST, No Additional Information. A check mark indicates that a current or former UST is known or suspected to exist on the parcel; however, no additional information exists. This would preclude a parcel from being CERFA-eligible. Due to the historical frequency with which USTs leaked, a check mark would place the parcel into BRAC Area Type 7. After further evaluation and/or sampling, the parcel may be reclassified.

¹⁹ Deputy Assistant Secretary of the Navy (Environment and Safety) Draft Policy Memorandum on Asbestos, Lead-based Paint, and Radon at Base Realignment and Closure Properties, dated January 24, 1994.

Known Contamination, Not Under Investigation. A check mark indicates that sampling has confirmed that contamination has occurred; however, no remedial investigation to determine the extent of contamination has begun. For example, an UST failing an integrity test and then abandoned in place without soil and/or groundwater sampling would receive a check mark. This would preclude a parcel from being CERFA-eligible. A check mark could place the parcel into BRAC Area Type 7. After further evaluation and/or sampling, the parcel may be reclassified.

Investigation Currently Underway. A check mark indicates that sampling has occurred or is underway to confirm the existence of contamination, and an agency is overseeing the site to determine the extent of contamination for the purpose of determining cleanup methods. This would include parcels involved in UST cleanup programs. This would preclude a parcel from being CERFA-eligible. A check mark could place the parcel into BRAC Area Type 7. After further evaluation and/or sampling, the parcel may be reclassified.

Potential Contamination Migration onto Parcel. A check mark indicates that contaminants have the potential to have traveled to the parcel through soil pores and/or groundwater. This category includes sources of potential contamination both on-site (on base) and off-site (neighboring properties). If an adjacent parcel had known contamination, the extent of contamination was unknown, and the subject parcel was believed to be potentially impacted, then this box was checked. If the extent of the contamination was unknown and the downgradient direction could not be determined through a document review, all surrounding parcels were checked. A check mark would preclude a parcel from being CERFA-eligible. A check mark could place the parcel into BRAC Area Type 7. After further evaluation and/or sampling, the parcel may be reclassified.

Documented Spills/Incidents without Approved Cleanup. A check mark indicates that spills and incidents occurred for which there has been no cleanup or for which cleanup has occurred without regulatory agency oversight and approval. Approved cleanup may not have been a requirement for the type of release that took place. An example would be an outside surface spill that was cleaned up with absorbent material, but no testing was done to confirm that the cleanup level achieved was below action levels. This would preclude a parcel from being CERFA-eligible. A check mark could place the parcel into BRAC Area Type 7. After further evaluation and/or sampling, the parcel may be reclassified. A check mark could place the parcel into BRAC Area Type 4.

Documented Spills/Incidents with Approved Cleanup. A check mark indicates that leak, spill, and incident cleanups have been completed under regulatory agency oversight. An example would be a parcel on which a remedial action for a surface spill had been completed and the regulatory agency had indicated no further action was required. This would preclude a parcel from being CERFA-eligible. A check mark could place the parcel into BRAC Area Type 4.

Significant Staining Observed. A check mark indicates that areas were observed in a photograph or site walk to exhibit significant staining of the ground. Incidental small staining associated with vehicle parking was not considered. This would preclude a parcel from being CERFA-eligible. A check mark could place the parcel into BRAC Area Type 7. After further evaluation and/or sampling, the parcel may be reclassified.

For purposes of field investigations at DODHF, significant staining generally refers to staining that spans at least two media and/or contacts the ground. For example, a stain that is evident on the side of a container, as well as the wooden pallet it rests on, is considered "significant staining". Staining localized on the top of a transformer, with no evidence of staining on its side or contact with another media, is considered "insignificant or minor staining". For instances where staining is evident on asphalt, concrete, or wood that is in contact with the ground, a determination has to be made as to whether the staining contacted the ground. Staining that appears to have crossed a break in the host material, or has reached the edge of the material is considered "significant".

Unconventional Building Demolition. A check mark indicates that a building was demolished by fire and/or explosives. There is an environmental concern regarding the potential leaching of contaminants from building materials in their molten state. This would preclude a parcel from being CERFA-eligible. A check mark could place the parcel into BRAC Area Type 7. After further evaluation and/or sampling, the parcel may be reclassified.

Potential Historical Adverse Use. A check mark indicates parcels where there have been building or property uses believed to include hazardous chemicals (e.g., dry cleaning facilities, gasoline service stations, auto repair shops, railroad tracks, medical clinics), but no records of storage or release were found during the document review. This would preclude a parcel from being CERFA-eligible. A check mark could place the parcel into BRAC Area Type 7. After further evaluation and/or sampling, the parcel may be reclassified.

Missing Data - Existing Condition Only

Information that is missing with regard to draft DOD policy²⁰ on lead-based paint, asbestos, and radon are indicated in the columns in this section. A check mark in any of these columns would not preclude a parcel from being CERFA-eligible, but DOD policy may require sampling or disclosure to the prospective transferee.

No or Incomplete Lead Paint Survey. A check mark indicates that either a lead-based paint survey was not conducted or that the survey was incomplete. A determination of an incomplete survey means that a portion of the structure or parcel was not surveyed. Information used to make this determination came either from the survey results or was verbally given to ERM-West by the Navy or by the Navy's lead-based paint contractor.

An "X" in the column indicates that the criteria is not applicable. Draft DOD policy only requires housing²¹ to be tested for lead paint, although there is currently no state or federal requirement. A parcel with no structures would also receive an "X." Based on the construction date of most of the structures at DODHF Novato, all painted structures are suspected to have had lead-based paint coatings.

No or Incomplete Asbestos Survey. A check mark indicates that either an asbestos survey was not conducted or the survey was incomplete. Incomplete means that a portion of the structure or parcel was not surveyed. Information used to determine that a survey was incomplete came either from the survey results or was verbally given to ERM-West by the Navy or by the Navy's asbestos contractor. Following draft DOD policy, asbestos surveys are required for commercial/industrial property, as well as for housing prior to transfer. A complete asbestos survey for all the structures at DODHF Novato has not been completed.

An "X" in the column indicates that the criteria is not applicable. Asbestos surveys are not required for a parcel containing no structures.

²⁰ Deputy Assistant Secretary of the Navy (Environment and Safety) Draft Policy Memorandum on Asbestos, Lead-based Paint, and Radon at Base Realignment and Closure Properties, dated January 24, 1994.

²¹ EFAWEST has interpreted housing to refer only to residential family housing, schools, and child care centers. Specifically excluded from this definition are barracks and motels.

No Radon Survey. A check mark indicates that no radon study had been conducted on the parcel. Following draft DOD policy, radon will only be considered for the purposes of transfer only for parcels containing housing. For all other parcels, radon will be noted if representative sampling has not been completed. Radon will not be considered for non-housing parcels.

An "X" in the column indicates that the criteria is not applicable. Radon surveys are not needed for open spaces or unoccupied structures.

Other (see Comments)

A check mark indicates issues associated with these parcels that may or may not require further investigation. Examples include the possibility of contaminated fill soil, signs indicating possible former chemical use, or other issues that were not shown elsewhere on the table. See the Comments column for a description of the concern. This may preclude a parcel from being CERFA-eligible. A check mark could place the parcel into BRAC Area Type 7. After further evaluation and/or sampling, the parcel may be reclassified.

Zone Assessment Summaries

ERM-West parceled the area encompassed by DODHF Novato into 129 parcels within eight distinct zones. The zones are listed by name below and Figure 4-1, provided at the end of this section, depicts Zones A through H.

Zone A: Commissary Triangle

Zone B: Navy Exchange

Zone C: Air Force Triangle

Zone D: Knolls Housing and Recreation

Zone E: Former Runway and Recreation

Zone F: Spanish Housing

Zone G: Capehart Housing

Zone H: Rafael Village

The results of the EBS effort are provided in the remainder of this section for each parcel on a zone-by-zone basis. These zone assessment summaries (ZASs), which were developed based on the Phase I and II information consolidated in the database, briefly describe each parcel and include a parcel history, a comprehensive issues subsection addressing each issue of potential environmental concern, and a concluding subsection listing the parcel-specific issues of concern and corresponding BRAC classifications.

ZONE A

Zone A, which is known as the Commissary Triangle, is 13.2 acres in size and consists of Parcels 1 through 15. Zone A is located in the northwestern portion of the primary base at DODHF Novato. Parcel 10 has received written agency concurrence as a BRAC Category 1 parcel, and Parcel 13 has received verbal concurrence as a BRAC Category 1 parcel.

Zone A is bounded by undeveloped land to the west and north (Parcel 901), railroad tracks to the northeast (Parcel 916), and by the Naval Exchange Area (Zone B) and residential property (Parcel 908) to the south.

Zone Use and History

Buildings within Zone A have been used as dry cleaning/laundry facilities, vehicle maintenance shops, vehicle storage, a morgue, offices, retail stores, storage and supply warehouses, and the base Commissary. The primary tenants of this area have been Morale, Welfare & Recreation (MWR) and Naval Exchange (NEX).

Currently, ten buildings are present within Zone A: Building 829 (vehicle storage), Building 826 (abandoned), Building 827 (abandoned), Building 820 (carpentry shop/material storage), Building 821 (material storage), Building 816 (auto hobby shop), Building 804 (Commissary), Building 803 (NEX storage), Building 802 (abandoned/paper storage), and Building 801 (material storage).

In addition, five buildings were formerly present within Zone A: an unnumbered building within Parcel 1 (unknown use), Building 828 (supply and equipment warehouse), Building 825 (dry cleaning/laundry facility), an unnumbered building within Parcel 9 (unknown use), and an unnumbered building within Parcel 15 (unknown use). Buildings 825 and 828 were demolished after 1975. The former building on Parcel 1, 9, and 15 were demolished either before 1958 or in the sixties.

Listings of current and former buildings and structures in the zone, as well as their parcel-specific locations, are provided in Tables 4-1 and 4-2. More detailed information regarding the specifications and uses of current and former buildings is presented below; current buildings are

presented first and former buildings are presented last. Within each grouping, the building descriptions are ordered by parcel number.

Building 829. This is a 9,400-square-foot, single-story building currently used for vehicle, furniture, and scrap lumber storage. The building was constructed in 1944 on Parcel 3 and was previously used as a Commissary/general store, Naval Exchange/retail store, and warehouse for NEX.

Building 826. This is a 4,000-square-foot, single-story building that is currently boarded up and is in decrepit condition. The interior contains debris, furniture, lumber, and small quantities of paints, lacquer thinner, and petroleum products in cans. Building 826 was constructed in 1953 on Parcel 4 and was previously used as a dry cleaning/laundry facility.

Building 827. This is an approximately 1,500-square-foot, single-story building that is currently abandoned and filled with general refuse. The building was constructed prior to 1953 on Parcel 4 and was previously used as a cold storage facility by NEX.

Building 821. This is a 6,300-square-foot, single-story building that is divided into three sections. The west end of the building is a carpentry shop; the middle portion is used to store furniture, lawn equipment, and lumber; and the east end is used to store furniture and miscellaneous items. Building 821 was constructed in 1942 on Parcel 6 and was previously used as a carpentry shop, an equipment/automobile maintenance shop, and a warehouse.

Building 820. This is a 2,700-square-foot, single-story building used to store materials including furniture, lawnmowers, and major appliances (e.g., refrigerators, washing machines). The west end of the building is used a carpenter shop. The east end of the building was not accessible during the site inspections. The building was constructed in 1942 on Parcel 7 and was previously used as a warehouse and equipment maintenance shop.

Building 816. This is a 9,500-square-foot, single-story building used as an auto hobby shop/self-service auto maintenance facility overseen by MWR. The building was constructed in 1943 on Parcel 8 and has historically been used as an auto hobby shop, a metal hobby shop, and a wood hobby shop.

Building 804. This is a 20,000-square-foot, single-story building used as the base Commissary, which is a general store for the use of Navy personnel. The building was constructed in 1942 on Parcel 11 and has served as a Commissary for most of its existence; however, the building

is reported to have been originally used as a morgue (for cold storage only).

Building 803. This is a 9,000-square-foot, single-story building used for food and dry product storage by NEX. The building was constructed on Parcel 12 in 1943 and has consistently been used as a warehouse.

Building 802. This is a 3,688-square-foot, single-story building that is mostly abandoned and in poor condition. The building is used to store files and miscellaneous materials for NEX. The building was constructed on Parcel 13 in 1942 and was previously used as the administrative headquarters for the morgue and, subsequently, as an administrative office for NEX.

Building 801. This is a 9,000-square-foot, single-story building used for miscellaneous material storage by NEX. The building was constructed on Parcel 14 in 1943 and has consistently been used as a warehouse.

Unnumbered Building (demolished). This building, which appears in historical aerial photographs and base maps of Parcel 1, appears to be a small shed less than 1,000 square feet in size. The building number and former use of this structure are unknown. It was apparently demolished in the 1960s. The foundation, which is surrounded by an undeveloped grassy area, is evident on the west side of Parcel 1.

Building 828 (demolished). The foundation for this former building is still evident in the center of Parcel 2; it is bordered to the south by asphalt and to the north by an undeveloped grassy area. The building was apparently constructed in 1942 and was demolished between 1985 and 1991. Building 828 was approximately 9,000 square feet in size. Its former use is unknown.

Building 825 (demolished). The foundation for this former building is still evident in the center of Parcel 5 and is currently surrounded by asphalt pavement. The building was apparently constructed prior to March 1958 and was demolished between 1975 and 1981. Building 825 was approximately 4,000 square feet in size and is listed as having previously been a dry cleaning/laundry facility.

Unnumbered Building (demolished). This building appears in historical aerial photographs and base maps of Parcel 9. The building number and former use of this structure are unknown. It was apparently demolished prior to the 1958 aerial photograph.

Unnumbered Building (demolished). This building, which appears in historical aerial photographs and base maps of Parcel 15, appears to be a small shed under 1,000 square feet in size. The building number and

former use of this structure are unknown. It was apparently constructed and demolished prior to March 1958. Currently, Parcel 15 consists of an undeveloped grassy area; no former building foundation is evident.

Open Space. Exterior areas in Zone A consist of 70 percent asphalt paved areas, 20 percent grassy undeveloped areas, and 10 percent concrete. Open space currently and historically has been mainly used for equipment storage (mostly forklifts), miscellaneous material storage, and vehicle and equipment parking.

Zone Issues

Parcel-specific BRAC classifications and environmental issues of concern for Zone A are presented within Table 4-3. Environmental issues of concern are discussed below. If no statement regarding the presence of staining or other evidence of potential release is made in the following subsections regarding areas of chemical storage, transformers, ASTs, or work areas, then no staining was noted during the site inspections.

According to the Radiological Affairs Support Office (RASO), radiological materials are not of concern at DODHF Novato. A base-wide statistical radon survey of DODHF Novato performed in 1991 concluded that radon concentrations were below the EPA action level of four picocuries per liter. No evidence of current or former lead release issues, unconventional building demolition, ordnance storage or use, or potential contamination migration from neighboring zones was identified for Zone A.

Transformers located on Parcels 1, 3, 4, 8, and 11 were visually inspected and showed no signs of release to the environment. Also, lead based paint and/or asbestos containing materials may be present on structures within Zone A; however, no signs of releases to the environment beyond typical weathering were noted during site inspections.

Aboveground Storage Tanks (ASTs)

One AST, located at the southwest interior wall of Building 816 (Parcel 8), is approximately 500 gallons in size and is currently being used to store waste oil generated from automobile maintenance activities. Secondary containment around this tank consists of a 6-inch-high steel

berm. The concrete underlying the tank, both inside and outside the berm, is heavily stained.

Another AST, located immediately south of Building 804 (Parcel 11), is 1,000 gallons in size and is used to supply the emergency generator in Building 804. The berm around the tank appears to be in good condition, but it was unclear from site walk information whether the floor of the secondary containment area was intact. There was no indication that a release had occurred in the area of this AST.

Chemical Storage

Less than 100 gallons of consumer-packaged automotive products were located inside Building 816 (Parcel 8) at the time of the site inspection. Two solvent degreasing basins were located at the southeast corner of the building. Each degreasing basin contained approximately 30 gallons of solvent (currently, the solvent is nonhalogenated, but solvent historically used in this area was most likely halogenated). Also, approximately 50 gallons of grease and oil were noted throughout the building. Staining was noted surrounding these dip tanks, and scattered staining was noted throughout the building. The scattered stains generally covered less than four square feet, and were estimated to cover a total of 5 percent of the floor area. A strong petroleum odor was noted in the building during the site inspection.

Two hazardous materials lockers are located on Parcel 8 in open space northwest of Building 816. One of the lockers is empty and the other is used to store approximately 2 gallons of paint. No staining was noted in the vicinity of the storage lockers.

Buildings 826 (Parcel 4) and 825 (Parcel 5) were previously used for dry cleaning activities. As such, it is considered likely that dry cleaning chemicals (which could include Stoddard solvent and/or perchloroethylene) were stored within and around Buildings 826 and 825. Chemicals, including 100 gallons of miscellaneous cleaners, 100 gallons of latex paint, 10 gallons of petroleum products, 10 gallons of lacquer thinner, two apparently empty 55-gallon drums, and two compressed gas cylinders, were stored inside Building 826 at the time of the site inspection. No significant staining was noted within these Parcels; however, dry cleaning activities may not produce notable staining.

Buildings 821 (Parcel 6) and 820 (Parcel 7) are historically listed as automotive maintenance buildings. Other than this listing, no other information has indicated or confirmed this historic use. At the time of the site investigation, approximately 50 gallons of paint and 5

gallons of gasoline were stored inside Building 821 (Parcel 6) at the time of the site inspection. Approximately 50 gallons of latex paint, 5 gallons of gasoline, and 5 gallons of carburetor cleaner were stored inside Building 820 (Parcel 7) at the time of the site inspection. Since no significant staining was evident, the chemical storage associated with Parcels 6 and 7 is not considered an issue. In addition, other than a building list, there is no other information indicating that any environmentally significant auto maintenance activities occurred within these buildings.

Several other parcels within Zone A have chemical storage areas. One 55-gallon drum labeled "diesel fuel" is stored over bare soil on a wooden pallet in open space on Parcel 9. The drum is aged but intact and there is no evidence of staining or of release to the environment. A hazardous material storage locker was located in the open space on Parcel 12, northwest of Building 803. Reportedly, less than 10 gallons of gasoline used for fueling forklifts were stored inside the locker. There was no evidence of staining or release associated with this chemical storage area.

Minor or insignificant chemical storage was noted on several other parcels within Zone A. Parcel 1 contains an inactive transformer that shows no signs of leaks or stains. Building 804 (Parcel 11) is the base commissary and stores prepackaged consumer products. Building 801 (Parcel 14) contains a hazardous waste storage locker with small quantities of paints. No evidence of leaks or stains was noted on Parcels 11 or 14.

Hazardous Waste Generation and/or Storage

Hazardous waste is generated within Building 816 (Parcel 8). Waste oil generated from automobile maintenance activities conducted at Building 816 is poured into the building's AST (previously discussed). A 55-gallon drum, which was intact and underlain by concrete, was located adjacent to the AST. The drum contained used oil filters. In addition, it is likely that other hazardous wastes (antifreeze, paint wastes, and solvents) are routinely generated in this area, although no additional hazardous waste collection points were observed during the site inspection. Degreasing basins (previously discussed) are regularly drained of solvent by Safety Kleen.

Buildings 821 (Parcel 6) and 820 (Parcel 7) are historically listed as automotive maintenance buildings. Auto maintenance activities generally produce some quantity of hazardous waste. Other than this listing, no other visual or anecdotal information has indicated or confirmed this historic use. Since no significant staining was evident,

the potential for former hazardous waste storage on Parcels 6 and 7, is not considered an issue.

During the initial site drive through on November 9, 1993, five unlabeled 55-gallon drums with unknown contents were observed in the open area of Parcel 1. No evidence of staining or release was noted at this time. The drums were no longer present during site inspections in January 1995. Again, there was no indication of staining, stressed vegetation, or other signs of release associated with this storage area; however, there was staining noted in other areas of the parcel.

Potential Historical Adverse Use

Building 816 (Parcel 8) is currently used as an auto hobby shop and was previously used as a metal and wood hobby shop.

Reportedly, Buildings 826 (Parcel 4) and 825 (Parcel 5) had been used as dry cleaning facilities, although the nature and extent of dry cleaning activities has not been established.

Buildings 821 (Parcel 6) and 820 (Parcel 7) are historically listed as automotive maintenance buildings. Auto maintenance activities generally involve the handling of hazardous chemicals and wastes; however, no significant staining was evident on these Parcels. Other than the cited building listing, no other anecdotal or visual information has confirmed these buildings have been used for any environmentally significant activities.

Spills/Incidents (With and Without Approved Cleanup)

During the site inspection, an incident occurred directly north of Building 801 (Parcel 14). Nine 2-liter containers filled with oil had been deposited in this location with municipal trash for disposal. A motorcyclist accidentally drove through the trash and crushed all nine containers. Oil released from the containers covered a 15-foot-by-15-foot asphalt-paved area. Subsequently, the spill was cleaned up. Although it was not an approved clean-up, the spill was contained on asphalt and the excess oil was removed.

Significant Staining

During the site inspection, significant staining was observed inside and immediately outside of Building 816 (Parcel 8). Light stains covered a 3-foot-by-6-foot concrete area adjacent to the degreasing basins at the

building's southeast corner. Staining appeared to extend through a nearby drainage hole out to the building's exterior, although the extent of staining on exterior asphalt was unclear. A corrosion hole was located in the wall immediately adjacent to the drainage hole. Scattered staining covering approximately 5 percent of the total floor area of Building 816 was also observed. The scattered stains each covered generally less than four square feet.

During the site inspection, pooled storm water in Parcels 1 and 2 was observed to be brown in color and to have an oily sheen and a petroleum odor. Approximately five such pools were present; the largest pool was located in the center of Parcel 2 and covered a 4-foot-by-10-foot area. Vegetation in this area did not appear to be distressed. Staining was also evident in the center of Parcel 2 in the vicinity of the puddles.

Minor staining has been noted on other parcels within Zone A. Parcel 14 exhibited staining from waste oil as described in "Spills/Incidents". Given these releases occurred on asphalt and the minor amounts involved, it is recommended that no further action is necessary for Parcel 14. In addition, Parcel 11 has been identified as having staining typical of vehicle parking.

Underground Storage Tanks (USTs)

During the site inspection, four vent pipes and two fill ports indicative of several USTs were observed immediately west of Building 827 (Parcel 4). No documentation regarding the presence and/or absence of USTs at this parcel has been located.

Utilities

Potentially contaminated sanitary sewer lines are present beneath Zone A at Parcels 1, 2, 3, 4, 5, 6, 7, 8, 9, 12, 14, and 15. Sanitary sewer lines are suspected to have been impacted by historical dry cleaning activities at Buildings 826 and 825 (Parcels 4 and 5, respectively), automobile maintenance activities at Building 816 (Parcel 8), and by historical maintenance activities conducted at property currently controlled by the US Army (Parcel 901).

Potentially contaminated storm sewer lines leading from Building 816 on Parcel 8 (the auto hobby shop) are present beneath Zone A at Parcels 8, 14, and 15. During the site inspection, drains located outside Building 816's east and west bay doors were observed to be filled with what appeared to be an oil/water mixture.

A 2-foot-by-2-foot brick vault is located immediately south of Building 827; a single pipe outlet observed inside the vault apparently originates from Building 827 on Parcel 4. The vault is filled with soil. Its former purpose is unknown.

Other utilities identified on Zone A include natural gas lines, water lines, and electrical distribution lines.

Summary

In summary, data gaps regarding ASTs, chemical storage, hazardous waste generation and/or storage, potential historical adverse use, spills/incidents, significant staining, USTs, underground sanitary sewer lines, and underground storm sewer lines still exist for Parcels 1 through 9, 11, 12, 14, and 15. These issues must be resolved before these parcels can be reclassified from BRAC Category 7 to another BRAC category.

Parcel 10 has received written agency concurrence as a BRAC Category 1 parcel, Parcel 13 has received verbal concurrence as a BRAC Category 1 parcel. Descriptions of recommended CERFA-eligible parcels that have not yet received written concurrence are provided in Section 5 of this document.

Environmental issues such as asbestos, lead-based paint, and oil-filled electrical equipment need to be sampled for and/or disclosed in accordance with DOD policy, but do not affect BRAC classifications.

ZONE B

Zone B, the Exchange Area, is comprised of Parcels 16, 17, 18, 19, 21, 22, 23, 24, 25, 28, and 29. This zone is 9.7 acres in size and is located in the northwestern portion of the primary base for DODHF Novato.

Zone B is bounded by undeveloped land to the west (Parcel 908), Capehart Housing (Zone G) to the south, the Commissary Triangle (Zone A) and railroad tracks (Parcel 916) to the north, and Air Force Triangle (Zone C) to the east.

Zone Use and History

The Exchange Area has been used for vehicle-related repair, vehicle storage, fueling activities, vehicle parking, and hazardous waste storage. Buildings within the Exchange Area have been used as automobile maintenance shops, wood and metal shops, a vehicle wash rack, hazardous materials storage, a service station, housing, and housing maintenance shops.

Currently, seven buildings are located within Zone B (Buildings 960 and 965 - Housing Maintenance Shops and Offices; Buildings 969 and 972 - PWC Shop Storage; Building 970 - Service Station; Building 971 - Navy Exchange; and Building 973 - Youth Recreation Center. Nine buildings were formerly located within Zone B and have since been demolished (Buildings 950, 951, 954, and 955 - Automobile Maintenance Shops; Building 957 - Fueling Station and Hazardous Waste Accumulation Area; Building 958 - Paint and Hazardous Materials Storage; Building 961 - Auto Service and Wash Rack; Building 983 - Bus Shelter; Building 985 - Recreational/Multipurpose; and Building 986 - Traffic Check House). The dates of demolition, if known, are provided in the building descriptions that follow.

Listings of current and former buildings and structures in the zone, as well as their parcel specific locations, are provided in Tables 4-1 and 4-2. More detailed information regarding the specifications and uses of current and former buildings is presented below; current buildings are presented first, and former buildings are presented last. Within each grouping, the building descriptions are ordered by building number.

Building 960. This one-story, 3,000-square foot building located on Parcel 21 is currently used as the housing maintenance office and shop. Landscaping equipment, tools, and chemicals were stored within this

building during the site inspection. The shop area is used for the maintenance and repair of landscaping equipment. Building 960 was formerly used as an automobile maintenance shop. According to interview information, a tire shop was also formerly located at Building 960. Building 960 was constructed in 1942. Building 960 may potentially be included in the National Register of Historic Places.

Building 965. This one-story, 660-square foot building located on Parcel 22 has been used as a housing maintenance shop and office. Although it was vacant at the time of the site inspection, Building 965 was reportedly being used for storage by an independent landscaping contractor. Signs on the interior walls of the building stated "Charged Batteries" and "No Smoking." An apparently sealed floor drain was located in the center of the floor. Building 965 was constructed in 1958 and was formerly used as an automobile maintenance shop.

Building 969. This one-story, 3,000-square foot building located on Parcel 23 is used for storage by PWC shops. Types of items stored at Building 969 include new refrigerators, project materials, and tools. PWC shop activities include carpentry, electrical equipment repairs, glazing, painting, pipe fitting/plumbing, sheet metal fabrication, and welding/cutting. Building 969, which was constructed in 1942, was formerly used as an automobile maintenance shop. This building may potentially be included in the National Register of Historic Places.

Building 970. This 4,500-square foot building located on Parcel 29 serves as the Navy Exchange Service Station. (Buildings 983, 985, and 986 were formerly located where Building 970 is now located.) Two hydraulic lifts are located in the service bays of the building. Chemicals and equipment typically found in an automobile service station (dip tanks, waste oil drums, waste oil filter drums, tools, lubricating grease, etc.) are located within Building 970. In addition, oily uniforms and rags, waste oil filters and approximately 200 gallons of oil are located at this building. Building 970 was constructed in 1974. During the site inspection, a petroleum odor was noted throughout the interior of the building. Two active USTs are located southeast of this building. One waste oil tank and one leaking gasoline tank were recently removed.

Building 971. This one-story building located on Parcel 16 has been used as the Navy Exchange (shopping center) and dry cleaners. A beauty salon, barber shop, and optician are also located in Building 971. Although a dry cleaner is located at Building 971, interview information indicates that no dry cleaning is performed on site. Typical activities conducted at the Navy Exchange include the storage and sale of groceries and consumer-related items. This building was constructed in 1975 and recently remodeled. Buildings 950 and 951

were formerly located at the current location of Building 971, and were reportedly used as automobile maintenance facilities.

Building 972. This one-story, 18,000-square foot building located on Parcel 24 is used for PWC shops, administrative offices, and storage. Site inspection data indicate that Building 972 is currently used as a PWC garage for storage, wood working, and metal working. The carpentry shop employs a cyclone dust collection system. In 1992, a hazardous waste storage area was moved from Buildings 957 and 958 to Building 972. This building formerly stored new refrigerators, stock, project materials, and tools. Building 972 was formerly an automobile maintenance shop and a motor pool. During the site inspection, evidence of former hydraulic vehicle lifts was noted in the concrete floor. Building 972 was constructed in 1942. This building may potentially be included on the National Register of Historical Places.

Building 973. This 2,200-square foot building located on Parcel 25 is currently used as a youth recreation center. Building 973, which was constructed in 1943, was formerly used as an automobile maintenance shop.

Building 950 (demolished). This building was located on Parcel 16 and was used as an automobile maintenance shop. Building 950 was located where Building 971 is currently located. The construction date and size of this building are unknown. Based on historical aerial photographs, Building 950 was demolished between 1968 and 1972.

Building 951 (demolished). This building was also located on Parcel 16 and was used as an automobile maintenance shop. Building 951 was located where Building 971 is currently located. The construction date and size of this building is unknown. Based on historical aerial photographs, Building 950 was demolished between 1968 and 1972.

Building 954 (demolished). This building, which was formerly located on Parcel 19, was used as an automobile maintenance shop. The construction date, size, types of maintenance activities conducted, and demolition date are unknown.

Building 955 (demolished). This building, which was formerly located on Parcel 19, was used as an automobile maintenance shop. The construction date, size, types of maintenance activities conducted, and demolition date are unknown.

Building 957 (demolished). This building, which was formerly located on Parcel 19, was used as a fueling station. According to interview information, hazardous wastes were accumulated in Buildings 957 and 958 prior to 1992. In 1992, the hazardous waste storage area was moved

to Building 972. The construction date, size, and demolition date of Building 957 are unknown.

Building 958 (demolished). This building, which was formerly located on Parcel 19, was used for paint and dope storage as well as hazardous materials storage. According to interview information, hazardous wastes were accumulated in Buildings 957 and 958 prior to 1992. In 1992, the hazardous waste storage area was moved to Building 972. The construction date, size, and demolition date of Building 958 are unknown.

Building 961 (demolished). This former building, which was located on Parcel 18, was used as an auto service and wash rack facility. The construction date and size of this building are unknown.

Building 983 (demolished). This former building, which was located on Parcel 29, was used as a bus shelter. Based on historical aerial photographs, Building 983 was demolished between 1958 and 1963. The construction date and size of this building are unknown.

Building 985 (demolished). This former building, which was located on Parcel 29, was used as a recreational/multipurpose facility. Based on historical aerial photographs, Building 985 was demolished between 1958 and 1963. The construction date and size of this building are unknown.

Building 986 (demolished). This former building, which was located on Parcel 29, was used as a traffic check house. Based on historical aerial photographs, Building 986 was demolished between 1958 and 1963. The construction date and size of this building are unknown.

Open Space. The open space in Zone B is primarily used as for vehicle roadways, vehicle parking areas, pedestrian walkways, landscaped grassy areas, material and drum storage, vehicle washdown, and PWC vehicle and equipment parking areas. During the site inspection, a contractor was using the eastern portion of Zone B as a temporary storage area for lumber (to be used for fence construction at Novato). The open space surrounding Building 965 was used as a work, and storage area (i.e., wood, wood chips, lumber, etc.) for a landscaping contractor. The open space southeast of Building 965 was also being used as a washdown area. The open space surrounding Building 972 is used for PWC storage (including landscaping, carpentry, and painting refuse. During the site inspection, used paint containers were also stored on the asphalt. Based on historical aerial photographs, one unnumbered building was formerly located on Parcel 28. The open space of Parcel 28 is currently used to store recreation vehicles. The open space of Parcel 18 is used primarily for vehicle parking for

customers of the Navy Exchange (Building 971). The open space of Parcel 19 is used primarily for PWC storage and general refuse disposal (i.e., lumber, wood scrap, paper, etc.). Based on site inspection data, a sloped concrete pad in Parcel 22 appears to have been used as a washdown area. No additional information is available concerning the activities conducted at this concrete pad.

Zone Issues

Parcel-specific BRAC classifications and environmental issues of concern for Zone B are presented within Table 4-3. Environmental issues of concern are discussed below. If no statement regarding the presence of staining or other evidence of potential release is made in the following subsections regarding areas of chemical storage, transformers, ASTs, work areas, etc., then no staining was noted during the site inspections.

According to RASO, radiological materials are not of concern at DODHF Novato. Also, a base-wide statistical radon survey of DODHF Novato performed in 1991 concluded that radon concentrations were well below the EPA action level of four picocuries per liter. No evidence of ASTs, unconventional building demolition, ordnance storage or use, or potential contamination migration from neighboring zones were identified for Zone B.

Transformers located on Parcels 16, 18, and 29 were visually inspected and showed no signs of release to the environment. Also, lead based paint and/or asbestos containing materials may be present on structures within Zone B; however, no signs of releases to the environment beyond typical weathering were noted during site inspections.

Chemical Storage

During the site inspection, a PWC diesel-powered portable generator, a PWC spill kit, four empty drums, one empty 35-gallon drum labeled "Hazardous Ingredients", and two locked storage lockers were observed in the southwest portion of Parcel 18.

Approximately 60 gallons of paint, paint thinner, and gasoline were stored in a flammable materials locker on the building pad of former Building 958 on Parcel 19. Although the flammable materials locker was located within a concrete secondary containment berm, the containment area was filled with water and had a drain in its west wall.

One 55-gallon drum of new motor oil was stored within Building 960 on Parcel 21. A dispenser in the top of the drum indicates that the drum is used to replenish oil supplies of landscaping equipment, within Building 960. Site inspection data indicate that a small bench-top parts cleaner containing less than 10 gallons of degreasing solvent was also present in the building. A hazardous material storage Conex box was also noted northeast of Building 960.

During the site inspection, a flammable materials locker that contained less than 50 gallons of gasoline and oil was noted near the northeast corner of Building 965 (Parcel 22). The gasoline and oil appeared to be used for the fueling and maintenance of landscaping equipment.

Approximately 5 gallons of cleaning solvents, caulking compounds, paint, and WD-40 were stored at Building 972 on Parcel 24. These chemicals were used for various building and equipment maintenance activities. Less than 150 gallons of latex paints and 20 gallons of cutting oil and lubricants were stored in Building 972 during the site inspection. Miscellaneous stains were noted on the concrete floor in the shop areas of Building 972 and on the asphalt surrounding the building. A fenced area near the west end of Building 972 on Parcel 24 is labeled "Engine Oil Barrel Storage (new & used)." A number of partially used 5-gallon paint cans (with staining evident) were located near this area as well.

During the site inspection, approximately 30 gallons of Safety Kleen solvent, 55 gallons of lube oil, 55 gallons of grease, less than 100 gallons of miscellaneous automobile products, and 5 gallons of brake fluid (in a dip tank) were stored in Building 970 and in the open space of Parcel 29. These chemicals are used by automobile mechanics and various automobile maintenance activities in Building 970. Minor staining and petroleum odors were noted throughout Building 970.

Minor or insignificant chemical storage was noted on several other parcels within Zone B. Building 971 (Parcel 16) contained small quantities of janitorial supplies and prepackaged consumer products. Building 969 (Parcel 23) is used for storage by the PWC and contained small quantities of pipe dope for plumbing projects. Building 973 (Parcel 25) contained small quantities of paints used in the Youth Center. No evidence of leaks or stains was noted on Parcels 16, 23, or 25.

Hazardous Waste Generation and/or Storage

Buildings 954 and 955 (formerly on Parcel 19) were historically used as auto maintenance shops. Auto maintenance activities generally

produce some quantity of hazardous waste. Other than this listing, no other information has indicated or confirmed this potential historic use. The current UST Program is conducting sampling in the immediate area of these former buildings.

Buildings 957 and 958 (formerly on Parcel 19) were collectively used as a GAP site prior to their demolition. The following is a summary of documented waste storage on Parcel 19.

- Approximately 16,330 pounds of asbestos, 1,900 pounds of waste solid, and 3,400 pounds of waste liquid were stored at this GAP site in 1991 prior to disposal.
- Approximately 1,200 pounds of oily water, 200 pounds of waste solid, and 820 pounds of waste paint were stored in Buildings 957 and 958 in 1990 prior to disposal.
- In 1989, approximately 14,800 pounds of waste lubricating oil was stored at Buildings 957 and 958 (the waste oil was donated to another government agency for incineration). Also in 1989, approximately 600 pounds of waste paint were stored at this GAP site prior to disposal.
- Approximately 4,000 pounds of PCB-containing solids, 5,000 pounds of PCB-containing liquids, 600 pounds of waste paint, and 900 pounds of waste fire retardant were stored at this GAP site in 1988 prior to disposal.
- In 1987, approximately 13 tons of waste asbestos, 542 gallons of an unknown waste organic liquid mixture, 3,500 pounds of empty paint cans, 65 pounds of empty containers, 800 pounds of PCB-containing liquid, and 1,200 pounds of PCB-containing solid were stored at this GAP site prior to disposal.

Buildings 960 (Parcel 21), 965 (Parcel 22), and 969 (Parcel 23) were historically used as automotive maintenance shops. Auto maintenance activities generally produce some quantity of hazardous waste. The physical characteristics of these buildings is indicative of activities that may be environmentally significant. The site investigation noted the presence of a wash rack and possible oil/water separator (Parcel 22), a sign indicating "battery storage" within Building 965 (Parcel 22), paint residue commonly associated with long term spray painting activities (Parcel 23), and garage bay doors sized to allow large vehicles to enter the buildings.

Two 55-gallon drums of waste oil and waste oil filters were stored on asphalt and bare soil in the southwestern portion of the open space of

Parcel 21 during the site inspection. The lid on one of the drums was loose. Absorbent had been applied to the base of the drum.

A GAP site is located northeast of Building 969 on Parcel 23. Empty drums were present in this location, but no waste was present. The GAP site is associated with PWC activities in Building 972 on the adjacent Parcel 24. The following is a summary of documented waste storage on Parcel 23.

- Approximately 20 cubic yards of asbestos were stored at this GAP site in 1994.
- Approximately 76 pounds of hydrazine waste and waste caustic liquid, 83 pounds of grease (non-RCRA hazardous waste), 482 pounds of asbestos, 34 pounds of dry calcium hypochlorite, 30 pounds of Stoddard solvent, 165 pounds of waste oil, 285 pounds of paint thinner, 90 pounds of latex paint, 145 pounds of enamel paint, 105 pounds of sodium hydroxide, 110 pounds of lube oil, 158 pounds of oil/water, 95 pounds of petroleum distillate, 960 pounds of solid "spill debris" (non-RCRA hazardous waste), 820 pounds of asbestos, 131 pounds of paint, 300 pounds of paint filters, 48 pounds of aerosols, 50 pounds of creosote, 100 pounds of solid sodium hydroxide, 87 pounds of waste flammable liquid (roofing tar), and 180 pounds of solid hazardous waste (grease) were stored at this GAP site in 1993.
- An unknown quantity of waste paint and miscellaneous items from Building 41 were also once stored at this GAP site. In addition, 231 pounds of waste latex paint and 97 pounds of waste latex paint cans were stored at this GAP site in an unspecified year.

A fenced area near the west end of Building 972 on Parcel 24 is labeled "Engine Oil Barrel Storage (new & used)." As previously noted, this issue will be addressed by Target Area B2. Buildings 972 and 973 (located on Parcels 24 and 25, respectively) were historically used as automotive maintenance shops. Auto maintenance activities generally produce some quantity of hazardous waste. In addition, Building 972 (Parcel 24) contains floor patching indicative of hydraulic lifts. Building 973 (Parcel 25) has been extensively remodeled for its current use as a youth center; however, there are several large ventilation stacks on the roof indicative of a more industrial former use.

Building 970 on Parcel 29 contains an automotive maintenance shop. Interview information indicates that oily waste uniforms, rags, and oil filters were stored in drums at Building 970 on Parcel 29. During the site inspection, three 55-gallon drums of waste oil, one 55-gallon drum

of waste oil filters, and 20 used batteries were stored in Building 970 and in the open space near Building 970. No secondary containment was provided for the used batteries. A shed at the rear of Building 970 is used to store empty drums and new tires.

Buildings 950 and 951 (formerly on Parcel 16) are listed as having been automotive maintenance shops. Building 971 (Parcel 16) was constructed over the former locations of these buildings and there is no visible sign of their former existence. Construction of Building 971 would have required the grading and removal of dirt from the area to a depth of roughly three feet. In addition, there is no information to confirm that Buildings 950 and 951 were used for auto maintenance.

Pesticide Use and/or Storage (Non-Routine)

A sign was evident north of Building 960 (Parcel 21) stating "Danger: poison storage area." A hazardous material storage Conex box was located in the vicinity, but no poison storage was noted during the site inspection.

Potential Contamination Migration from Neighboring Parcels

Former leaking underground storage tanks on Parcels 19, 24, and 29 potentially impact all of the parcels in this zone. A Draft Remedial Investigation/Feasibility Study that addresses the underground tanks on Parcels 19 and 24 has been completed and is pending comments and/or approval from regulatory agencies. Impacts to soil and ground water associated with these zone issues will be addressed by the UST Program.

Potential Historical Adverse Use

As previously noted, current or historic GAP sites are (or were) located in Buildings 957 and 958 (formerly located on Parcel 19), and in the northeast portion of Parcel 23.

Buildings 950 and 951 (formerly on Parcel 16) and Buildings 954 and 955 (formerly on Parcel 19) are listed as having been automotive maintenance shops. Building 971 (Parcel 16) and the associated parking area was constructed over the former locations of these buildings and there is no visible sign of their former existence. Construction of Building 971 would have required the grading and removal of dirt from the area to a depth of roughly three feet. In addition, other than a

historic building list, there is no information to confirm that these buildings were ever used for auto maintenance activities.

Buildings 960 (Parcel 21), 965 (Parcel 22), 969 (Parcel 23), 972 (Parcel 24), 973 (Parcel 25), and 970 (Parcel 29) have been or are used as automotive maintenance shops. Auto maintenance activities generally produce some quantity of hazardous waste. These buildings exhibit physical signs to suggest environmentally significant activities may have occurred on these parcels.

Significant Staining

Staining was noted on concrete beneath a truck and rider mower inside of Building 960 on Parcel 21. Absorbent material had been applied to the affected area.

Oil and paint staining was observed on Parcel 24 during the site inspection. The oil staining was located inside Building 972 around the cutting machinery. The paint staining was observed west of Building 972 near the 5-gallon cans of partially used paint.

Underground Storage Tanks (USTs)

Three parcels on Zone B (Parcels 19, 24, and 29) are currently under investigation under the DODHF Novato UST Program. The status of each investigation is summarized below.

Parcel 19 USTs

One UST (Tank 957) was formerly located north of former Building 957 (Service Station) and west of C Street on Parcel 19. This 12,000-gallon tank, which was used to store leaded gasoline, had been abandoned for approximately 20 years before it was removed in March 1992 by PRC. In addition to the tank, all underground piping associated with the tank was also removed. (The piping associated with the tank included 109 feet of underground product piping that formerly connected the tank to the fuel dispensing island and 10 feet of vent lines.)

During tank excavation activities, a strong hydrocarbon odor was detected. Although Tank 957 appeared to be in good condition at the time of removal, analytical results and field observation indicate that the tank was leaking. As part of the subsurface investigation associated with Tank 957, eight soil samples were collected from the piping trench and the sidewalls of the excavation and analyzed for BTEX, TPH-gasoline, TPH-unknown, and organic lead. Benzene, toluene,

ethylbenzene, and total xylenes were detected in the soil at maximum concentrations of 1.5 mg/kg (estimate), 18 mg/kg (estimate), 34 mg/kg (estimate), and 60 mg/kg, respectively. TPH-gasoline and TPH-unknown were detected in the soil at maximum concentrations of 1,200 mg/kg and 220 mg/kg, respectively. No organic lead was detected in any of the soil sample.

In addition to the soil samples, one groundwater sample was collected from the groundwater encountered during the excavation and analyzed for BTEX, TPH-gasoline, and TPH-unknown. Benzene, toluene, ethylbenzene, total xylenes, and TPH-gasoline were detected in the groundwater sample at maximum concentrations of 2.5 mg/L, 1.8 mg/L, 1.2 mg/L, 4.4 mg/L, and 60 mg/L, respectively. No TPH-unknown was detected in the groundwater sample. In addition, five composite samples were collected from the spoils pile and analyzed for BTEX, TPH-gasoline, TPH-unknown, and organic lead. Benzene, toluene, ethylbenzene, total xylenes, and TPH-unknown were detected in the soil samples collected from the spoils pile at maximum concentrations of 0.94 mg/kg (estimate), 3.2 mg/kg (estimate), 3.7 mg/kg (estimate), 24 mg/kg (estimate), and 850 mg/kg (estimate), respectively. TPH-gasoline was not detected above the detection limits.

Contamination from Tank 957 may have impacted the soil or groundwater at adjacent Parcels 16, 17, 18, 20, 24, 25, and 30. PRC concluded that portions of the underground piping was also leaking. PRC has recommended further study of this UST removal site to define the extent of soil and groundwater contamination around the Tank 957 excavation.

A second subsurface investigation (ERM, 1994) on Parcel 19 has been done to further define the extent of soil and groundwater contamination. Eighteen groundwater samples and 34 soil samples were collected from borings in late 1994 and early 1995. In addition, three monitoring wells were installed. TPH-gasoline, TPH-diesel, benzene, toluene, ethylbenzene, and xylene were detected in the Geoprobe soil samples at maximum concentrations of 12,000 mg/kg, 3,030 mg/kg, 37 mg/kg, 39 mg/kg, 81 mg/kg, and 230 mg/kg, respectively. Groundwater samples collected from the same borings contained TPH-gasoline, benzene, toluene, ethylbenzene, and xylene at maximum concentrations of 3,600 mg/L, 6.4 mg/L, 30 mg/L, 19 mg/L, and 42 mg/L, respectively. Soil samples collected from the three monitoring wells contained lead at a maximum concentration of 9.4 mg/kg. No TPH-gasoline, TPH-diesel, or BTEX were detected above detection limits.

Groundwater samples collected from the three monitoring wells contained TPH-gasoline, iron, magnesium, benzene, and total xylenes at maximum concentrations of 0.29 mg/L, 22 mg/L, 53 mg/L, 0.0053 mg/L, and 0.0017 mg/L, respectively. A Draft Remedial Investigation/Feasibility Study that addresses the Parcel 19 underground tank has been completed and is pending comments and/or approval by the regulatory agencies.

Parcel 24 USTs

One UST was formerly present on Parcel 24. It was a 4,000 gallon single-walled steel tank that was removed in 1992, and was addressed by PRC under the CLEAN contract.

Another UST (Tank 972) was formerly located west of Building 972 on Parcel 24. This 2,000-gallon tank, which supplied fuel oil to a former boiler room in the southwest corner of Building 972, was removed in March 1992 (PRC, 1992). Tank 972 was constructed of redwood. This tank was in good condition (i.e., no holes or corrosion) at the time of removal. In addition to Tank 972, approximately 35 feet of product piping and vent line were removed. The product piping and vent line were corroded and pitted with numerous holes (up to one-half inch in diameter). (Soil in the piping trenches had a strong hydrocarbon odor.)

Four soil samples were collected from the excavation floor and piping trenches and analyzed for BTEX, TPH-gasoline, TPH-unknown (purgeable), TPH-diesel, TPH-motor oil, and TPH-unknown (extractable). TPH-diesel, TPH-motor oil, total xylenes, and TPH-unknown (purgeable) were detected in the soil samples at maximum concentrations of 7,300 mg/kg, 1,100 mg/kg, 0.36 mg/kg, and 91 mg/kg, respectively. No benzene, toluene, ethylbenzene, TPH-gasoline, or TPH-unknown (extractable) were detected above the detection limits.

Because groundwater was not encountered during the tank excavation, no groundwater sample was collected. Two composite soil samples were also collected from the spoils pile and analyzed for BTEX, TPH-gasoline, TPH-unknown (purgeable), TPH-diesel, and TPH-motor oil. TPH-diesel, TPH-unknown (purgeables), and total xylenes were detected in the composite samples at maximum concentrations of 1,800 mg/kg, 170 mg/kg, and 0.38 mg/kg, respectively. No benzene, toluene, ethylbenzene, TPH-gasoline, or TPH-motor oil were detected above detection limits. PRC recommended further study of this UST removal site to define the extent of soil and groundwater contamination around the Tank 972 excavation.

A second subsurface investigation (ERM, 1994) on Parcel 24 has been done to further define the extent of soil and groundwater

contamination. Thirteen soil samples and six groundwater samples were collected from Geoprobe borings and the three monitoring wells west of Building 972 in November 1994 and December 1994. Soil samples collected from the Geoprobe borings were analyzed for TPH-gasoline and TPH-diesel. No TPH-gasoline or TPH-diesel were detected above detection limits. Groundwater samples collected from the Geoprobe borings were analyzed for TPH-gasoline, TPH-diesel, and BTEX. No TPH-gasoline, TPH-diesel, or BTEX were detected in the Geoprobe groundwater samples above detection limits.

Groundwater samples were also collected from three monitoring wells and analyzed for BTEX, TPH-gasoline, TPH-diesel, kerosene, motor oil, lead, iron, and magnesium. Iron and magnesium were detected in the groundwater at maximum concentrations of 36 mg/L and 49 mg/L, respectively. No BTEX, TPH-gasoline, TPH-diesel, kerosene, motor oil, or lead were detected in the groundwater at concentrations above detection limits. Soil samples collected from the three monitoring wells (and an abandoned monitoring well location) were analyzed for BTEX, TPH-gasoline, TPH-diesel, and lead. TPH-gasoline (>C8), TPH-diesel (C9 - C12), TPH-diesel (>16), TPH-diesel (C10-C22), and lead were detected in the soil samples at maximum concentrations of 15 mg/kg, 11 mg/kg, 2.7 mg/kg, 680 mg/kg, and 11 mg/kg, respectively. No benzene, toluene, ethylbenzene, or xylene were detected above detection limits. Contamination from Tank 972 may have impacted the soil or groundwater. A Draft Remedial Investigation/Feasibility Study that addresses the Parcel 24 underground tank has been completed and is pending comments and/or approval by the regulatory agencies.

Parcel 29 USTs

Two active, 10,300-gallon underground storage tanks are currently located southeast of Building 970 on Parcel 29. These active tanks are used to store unleaded gasoline for the fuel dispensing pumps associated with the Naval Exchange Service Station (Building 970). These single-walled steel tanks, which do not have leak detection systems, are tested annually. No recent tank testing data are available.

Two gasoline tanks were formerly located on Parcel 29. The 10,300-gallon gasoline tanks, which were located southeast of Building 970 (near the two active gasoline tanks described above), were removed in January 1995. During the site inspection, a visible sheen of petroleum product was noted on the water within the gasoline-tank excavation pit. One waste oil tank, formerly located immediately west of Building 970, was also recently removed. During the site inspection, the excavation pit was fenced off (it appeared that the underground

lines associated with the waste oil tank were in the process of being removed). The capacity of the waste oil tank was approximately 500 gallons.

The two gasoline USTs were removed in January 1995 by the Public Works Department. The USTs were located south of the pumping islands associated with Building 970. The tanks and associated piping were removed from a single excavation.

Eleven soil samples were collected from the excavation area during and after removal activities. All soil samples were analyzed for TPH as gasoline and BTEX. Results indicated the presence of TPH-G in soil at concentrations ranging from <1.0 to 520.0 mg/kg. BTEX compounds were detected at concentrations ranging from <0.005 to 11.0 mg/kg. Two groundwater samples were collected from the excavation on two different days. TPH-G concentrations ranged from 21,000 to 45,000 µg/L. BTEX compounds were also detected in groundwater samples above California MCLs. A work plan for continued investigation of these tanks was submitted by ERM-West in May 1995.

One two-chamber oil/water separator is located near the west side of Building 970 on Parcel 29. The floor drains within Building 970 are connected to this oil/water separator.

Impacts to soil and groundwater associated with these UST zone issues will be addressed by the UST Program.

Utilities

The sanitary sewer lines that cross Parcels 16, 17, 18, 21, 22, 23, 24, 25, 28, and 29 have potentially been impacted by historical activities that occurred upstream of Buildings 816, 960, 965, 969, 970, 971, 972, 973, 804, 803, 802, and 801, and the adjacent Army property (Parcel 901). The sanitary sewer line that crosses Parcel 28 originates at an excavation pit where a former oil/water separator was located.

The storm sewer lines at Parcels 16 and 18 have potentially been impacted by historical activities at former Buildings 957 and 958, and the adjacent Army property (Parcel 901). A storm sewer line that crosses Parcel 28 has an upgrading catch basin near the service station. A storm sewer line that crosses Parcel 29 also has an upgradient catch basin near the service station.

Other utilities identified on Zone B include natural gas lines, water lines, and electrical distribution lines.

Summary

No CERFA-eligible parcels exist within Zone B. Parcels 16, 17, 18, 19, 21, 22, 23, 24, 25, 28, and 29, are currently classified as BRAC Area Type 7. Concerns pertaining to chemical storage, hazardous waste generation and/or storage, potential contamination from neighboring parcels, potential historical adverse use, significant staining, USTs, underground sanitary sewer and storm sewer lines must be resolved before these parcels can be reclassified to another BRAC category.

Environmental issues such as asbestos, lead-based paint, and oil-filled electrical equipment must be sampled for and/or disclosed based on DOD policy, but do not affect BRAC classifications.

ZONE C

Zone C, the Air Force Triangle, consists of Parcels 20, 26, 27, and 30 through 49. Zone C is located in the northwestern portion of the primary base at DODHF Novato. Parcels 27, 31 through 41, and 44 through 49 have received either written or verbal DTSC concurrence as BRAC Category 1.

Zone C is approximately 9.6 acres in size and is located in the northwestern portion of the primary base at DODHF Novato. The zone is bounded by the Navy Exchange Zone (Zone B) to the west and north, railroad tracks (Parcel 916) to the east, and by Capehart Housing (Zone G) to the south.

Zone Use and History

Currently, seven buildings (Buildings 914, 915, 916, 930, 933, 934, and 935), one unnumbered temporary building, and a skateboard ramp structure occupy approximately five percent of Zone C. The remaining 95 percent of the zone is open space.

Zone C is known as the Air Force Triangle and was historically used as a personnel support facility when this area was occupied by the US Air Force. The area was originally designed as housing for enlisted personnel. Two buildings (Buildings 914 and 934) in this zone were used as mess halls. This area has also been used for exchange and commissary purposes, education and day care facilities, and recreational facilities. Air Force Triangle currently contains Building 930 (Credit Union), Building 914 (Thrift Shop), Buildings 934 and 935 (Youth Center), Buildings 915, 916, and 933 (Scouts), a temporary building, playgrounds for the day care center, activity areas for Boy and Girl Scouts, and a skateboard ramp.

In addition, this parcel has been occupied by fourteen buildings that have since been demolished and removed from the site. Buildings 909, 931, 932, 936, 937, and 938 were all part of the former Air Force Division Headquarters. The other buildings were used for a variety of other activities. These include: Buildings 910, 911, 912, 917, and 918 (Air Force Division quarters); Building 913 (a classroom and recreational facility); Building 926 (a supply warehouse); and Building 928 (a gymnasium).

Listings of current and former buildings and structures in the zone, as well as their parcel-specific locations, are provided in Tables 4-1 and 4-2. More detailed information regarding the specifications and uses of current and former buildings is presented below. The building descriptions are ordered by building number.

Building 914. This is a 4,320-square-foot, one-story building located in Parcel 45. The building, which was constructed in 1942, is currently used as a Thrift Shop. It had numerous former uses, including an Airmen's dining hall, a mess hall, expansion housing, and personnel support.

Building 915. This is a 1,750-square-foot, one-story building located in Parcel 46. The building, which was constructed in 1942, is currently used as an activity building for the Boy Scouts. It has been previously used for numerous other activities, including a Squadron Headquarters, a lounge, a toy store, and housing and personnel support.

Building 916. This is a 1,500-square-foot, one-story building located in Parcel 47. The building is currently used as storage for the Boy Scouts. The building, which was constructed in 1942, has been previously used for numerous other activities, including a supply and equipment room, a warehouse, and housing and personnel support.

Building 930. This is a 4,300-square-foot, two-story building located in Parcel 26. The building, which was constructed in 1942, is currently used as a Credit Union. It has been previously used for numerous other activities, including housing and personnel support, barracks, and Air Force Headquarters activities.

Building 933. This is a 1,750-square-foot, one-story building located in Parcel 35. The building is currently used as an activity building for the Boy and Girl Scouts. The building, which was constructed in 1942, has been previously used for numerous other activities, including Air Force Division Headquarters, barracks, recreation, expansion housing, and general support.

Building 934. This is a 4,320-square-foot, one-story building located in Parcel 36. The building, which was constructed in 1942, is currently used as a Youth Center. It has been previously used for numerous other activities, including barracks, recreation, expansion housing, general support, a mess hall, and a PX shop.

Building 935. This is a 1,500-square-foot building located in Parcel 37 and constructed in 1942. The building is currently used as a ceramics shop and activity room for the Youth Center. It has been previously

used for numerous other activities, including Air Force Division Headquarters, expansion housing, and personnel support.

Unnumbered Building. A small, unnumbered, temporary building currently used as a construction trailer is located on Parcel 44.

Former Buildings 909, 910, 911, 912, 913, 917, 918, 931, 932, 936, 937, and 938 (demolished). These buildings were part of the former Air Force Division Headquarters and were formerly used as classrooms, recreational activities, quarters, and administration. These buildings were constructed in the 1940s and were demolished prior to the 1991 aerial photograph.

Former Building 926 and 928 (demolished). Buildings 926 (a former supply warehouse) and 928 (a former gymnasium) occupied Parcel 20. The two buildings appear in a 1962 aerial photograph. A 1975 aerial photograph depicts a single structure. Neither building is present in the 1991 aerial photograph.

Open Space. The open space in Zone C, totaling approximately nine acres, is interspersed throughout the parcels in this Zone. The open space around the buildings is primarily landscaped grass.

Zone Issues

Parcel-specific BRAC classifications and environmental issues of concern for Zone C are presented within Table 4-3. Environmental issues of concern are discussed below. If no statement regarding the presence of staining or other evidence of potential release is made in the following subsections regarding areas of chemical storage, transformers, ASTs, work areas, etc., then no staining was noted during the site inspections.

According to RASO, radiological materials are not of concern at DODHF Novato. A base-wide radon survey performed in 1991 concluded that radon concentrations were below the EPA action level of four picocuries per liter at DODHF Novato. No evidence of current or former ASTs, lead release issues, ordnance storage or use, potential historical adverse use, or spills or incidents without approved cleanup was identified for Zone C.

The transformer located on Parcel 32 was visually inspected and showed no signs of release to the environment. Also, lead based paint and/or asbestos containing materials may be present on structures

within Zone C; however, no signs of releases to the environment beyond typical weathering were noted during site inspections.

Chemical Storage

A contractor yard was formerly located on Parcels 42 and 43, and was used for the storage of equipment and materials associated with a fence construction project on DODHF Novato. Five gallons of hydraulic fluid, six 5-gallon and three 1-gallon containers of diesel fuel, two unlabeled 5-gallon containers, and one unlabeled 55-gallon drum were noted on the eastern portion of Parcel 43 during one site inspection. Conex boxes located in this same area of Parcel 43 were also used for chemical storage, but a detailed inventory was not available. All of the chemical storage containers, except the drum and Conex boxes, were located on bare ground. This area was a general work area that was also used for equipment parking and tool washdown. Material storage, and vehicle and equipment parking occurs on Parcel 42. No chemical storage was noted on Parcel 42. No stains were observed in the area used for chemical storage on Parcel 43.

Potential Contamination Migration from Neighboring Parcels

An operating gasoline station (Building 970) is located on Parcel 29, which borders Parcel 30 to the west. Another UST, Tank 957, was located north of Building 957 (Parcel 19, Zone B), which borders Parcels 20 and 30. The USTs associated with these potential migration issues are being investigated under the DODHF Novato UST Program.

Significant Staining

Two stains on a gravel-paved area, measuring approximately 12 square feet each, were located to the west of the two metal storage sheds (Conex boxes) located on the eastern part of Parcel 43. As previously noted, Parcel 43 was used as a contractor yard for only a short time. In addition, a subsequent BCT site walk on October 4, 1995 revealed no visible staining.

Unconventional Building Demolition

Two buildings in the Air Force Triangle, Building 911 (Parcel 42) and Building 912 (Parcel 43), were set on fire by the Novato Fire Department for fire fighting training purposes. Evidence of the former buildings were noted on the ground surface (i.e., concrete footings,

asphalt walkways, and depressions) during the site inspections. Leaching of contaminants from building materials during their molten state is a potential environmental concern.

Utilities

Utilities identified on the zone include sanitary and storm sewer lines and electrical distribution lines. None have been identified as posing any environmental concerns. Parcels 26 and 41 contain a sanitary sewer that crosses Parcels 42 and 43, which have environmental issues of concern due to unconventional building demolition. However, Parcels 26 and 41 are upgradient of Parcels 42 and 43 on the sewer line.

Other

A makeshift culvert was excavated to direct wash water from the work area on the previously noted contractor yard located on Parcel 43. The culvert crossed Parcel 32 and fed into an existing culvert on Parcel 916. Site visits revealed that the wash area was used for cleaning excavation tools of dirt and cement residue. As of the BCT site walk on October 4, 1995, the makeshift culvert no longer exists and there is no visible staining associated with this project.

Summary

In summary, data gaps regarding potential contamination migration from neighboring zones and unconventional building demolition still exist for Parcels 20, 30, 42, and 43. These issues must be resolved before these parcels can be reclassified from BRAC Category 7 to another BRAC category. Parcels 27, 31, 33 through 40, and 45 through 49 have received written agency concurrence as a BRAC Category 1 parcels. Parcels 26, 32, 41, and 44 have received verbal agency concurrence as a BRAC Category 1 parcels. Descriptions of recommended CERFA-eligible parcels that have not received written agency concurrence are provided in Section 5 of this document.

Environmental issues such as asbestos, lead-based paint, and oil-filled electrical equipment need to be sampled for and/or disclosed in accordance with DOD policy, but do not affect BRAC classifications.

ZONE D

Zone D, the Knolls Housing and Recreational Zone, is comprised of Parcels 50, 51, 57, 58, 60, 61, 63, 67, 68, 69, 70, 71, 72, 84, 85, 87, 88, 89, 90, 91, 92, 93, 96, 97, 98, and 99. Parcels 51, 57, and 60 have received either verbal or written agency concurrence as BRAC Category 1 parcels, and Parcel 69 has received verbal concurrence as a BRAC Category 2 parcel.

Zone D is 37.7 acres in size and is located in the northeast-central portion of the primary base for DODHF Novato. Zone D is bounded by Army property to the north and east (Parcel 901), Spanish Housing (Zone F) to the west, and the Former Runway and Recreational Zone (Zone E) to the east.

Zone Use and History

The Knolls Housing and Recreational Zone has been used primarily for vehicle parking, recreational activities (e.g., swimming and tennis) and as a former medical facility. Buildings within this zone are currently used primarily for housing and recreational activities. A radio communications tower and associated equipment, and an aboveground water storage tank with associated aboveground valves and piping are located in the western portion of Zone D.

Currently, an outdoor amphitheater and approximately 50 housing units are located within Zone D. In addition, 17 non-residential buildings are located within Zone D (Building 111 - Vacant/Former Bachelor's Officer's Quarters; Building 113 - Indoor Racquetball Court; Building 115 - Gymnasium/Bowling Alley; Building 504 - Security Office/Paper Incinerator; Building 507 - Theater; Building 508 - Officers Club; Building 509 - Rest Rooms and Storage Shed; Building 513 - Private Housing Unit; Buildings 510 and 525 - Vacant/Former Medical Clinic and Ward; Building 528 - Vacant/Former Pool Water Treatment Facility; Building 531 - Day Care Center and Chapel; Building 549 - Radio Communications Facility; Buildings 101, 505, and 577 - Utility Vaults; and Building 603 - Chapel).

Approximately 30 buildings were formerly located within Zone D (Building 108 - Warehouse/Supply Facility; Buildings 103, 104, 105, 106, and 110 - Officers' Quarters; Building 506 - Utility Vault; Building 526 - Swimming Pool; Building 530 - Pool Bath House; and Buildings 522, 523, 529, 532, 534, 537, 538, 539, 540, 541, 542, 545, 546, 548, 554, 556, 558,

and 560, comprising the former medical/dental facilities), and approximately four buildings noted in historical aerial photographs for which former building numbers are unknown on Parcels 85, and 87. The uses of the four unnumbered buildings is unknown. The demolition dates of these buildings, if known, are provided in the building descriptions that follow.

Listings of current and former buildings and structures in the zone, as well as their parcel-specific locations, are provided in Tables 4-1 and 4-2. More detailed information regarding the specifications and uses of current and former buildings is presented below; current buildings are presented first, and former buildings are presented last. Within each grouping, the building descriptions are ordered by building number.

Amphitheater. The Amphitheater, which consists of terraced stone benches, is located on Parcel 71 and was constructed in 1935. Site inspection data indicate that the stone amphitheater is currently overgrown with vegetation and appears to be inactive. The Amphitheater may potentially be included in the National Register of Historic Places.

Building 101. This one-story, 120-square-foot building is used as an electrical transformer vault and switch station. Building 111 is located on Parcel 93 and was constructed between 1932 and 1946 and has no former uses. This building may potentially be included in the National Register of Historic Places.

Building 111. This two-story, 7,095-square-foot building located on Parcel 90 is currently vacant. Building 111, which was constructed between 1939 and 1942, was formerly used as Bachelor Officers' Quarters. A sign on the south wall of the building indicates the former presence of a wash rack. The exact purpose (i.e., vehicle washdown area, etc.) is unknown. This building may potentially be included in the National Register of Historic Places.

Building 113. This two-story building located on Parcel 89 is currently used as an indoor racquetball court. Building 113, which was constructed in 1994, was formerly an outdoor racquetball court.

Building 115. This 1.5-story, 20,000-square-foot building located on Parcel 88 has been used as a gymnasium and bowling alley. Building 115 was constructed in 1945. In 1982, the bowling alley was renovated. This building may potentially be included in the National Register of Historic Places.

Building 504. This one-story, 13,500-square-foot building located on Parcel 59 has been used as a security office, arts and crafts facility, base

communications facility, and telephone exchange. This building was formerly used by the cryptography unit. The building is currently occupied by base security offices, a telephone control station, and a folk art gallery. This building has previously been used as a HIS House, thrift shop, and health clinic. This building was constructed prior to 1952. Site inspection data indicate that an incinerator, which was used to burn paper only, is located in the building.

Building 505. This one-story, 117-square-foot concrete vault located on Parcel 61 was used as an electrical switch station. According to site inspection data, the building had been removed and one pad-mounted transformer was mounted on the remaining concrete pad. Building 505 was constructed in 1938.

Building 507. This two-story, 6,000-square-foot building located on Parcel 58 has been used as a theater since it was constructed in 1938. This building may potentially be included in the National Register of Historic Places.

Building 508. This two-story, 18,000-square-foot building located on Parcel 57 has been used as a Chief Petty Officers' (CPO) Club. Building 508, which was constructed in 1939, was previously used as a noncommissioned Officers' Mess and Club. Although it has suffered surface damage, Building 508 is structurally sound at the time of the site inspection and is scheduled to be renovated for use as a religious education, library, and family services facility. This building may potentially be included in the National Register of Historic Places. This building contains walk-in refrigeration equipment. Interview information indicates that this building was abandoned when its last occupant (the Air Force Department) left in 1975, although it has been used occasionally as a recreation club since that time.

Building 509. Site inspection data indicate that Building 509 located on Parcel 69 contains bathrooms and is currently abandoned. Building 509 was formerly used as a tennis equipment shed, storage shed, and heating facility. The construction date of Building 509 is not known.

Building 510. This 2,100-square-foot building located on Parcel 62 has been used as an infirmary, ward, medical clinic, treatment and rehabilitation facility, dental clinic, and surgery clinic. Building 510 was constructed in 1942. At the time of the site inspection, Building 510 was in poor condition and appeared to be abandoned. This building may potentially be included in the National Register of Historic Places.

Building 513. This two-story, 4,200-square-foot building located on Parcel 63 has been used as a duplex housing unit since it was

constructed in 1934. Because it is currently a private housing unit, Building 513 was not inspected during the site inspection of Zone D. This building may potentially be included in the National Register of Historic Places.

Building 525. This one-story, 1,350-square-foot building located on Parcel 68 has been used as an infirmary, ward, medical clinic, treatment and rehabilitation facility, supply and equipment warehouse, and as storage for hospital linen supply. During the site inspection, one door and several signs within this building were labeled "X-Ray," "Spill Response Safety Equipment," and "Alarm Service and TV Maintenance." Building 525, which was constructed in 1941, was vacant and appeared to be abandoned during the site inspection. This building may potentially be included in the National Register of Historic Places.

Building 528. This building is located on Parcel 69 and was formerly used as a swimming pool water treatment facility. Site inspection data indicate that this vacant building was formerly used as a chlorination house. The construction date of Building 528 is not known.

Building 531. This 1.5-story, 4,500-square-foot building located on Parcel 72 has been used as a day care center and a chapel. Site inspection data indicate that this building is currently used as a chapel. Building 531 was constructed in 1942, and a new addition to the south side of the building was constructed after 1952. This building may potentially be included in the National Register of Historic Places.

Building 549. This one-story building located on Parcel 67 has been used as a radio communications facility since it was constructed in 1934. This building is currently used by the Marin Amateur Radio Club (MARS) for radio communications-related activities. An electronics workshop and an emergency standby diesel generator were noted during the site inspection. This building may potentially be included in the National Register of Historic Places.

Building 577. This one-story, 114-square-foot building located on Parcel 84 has been used as a utility vault and switching station. One oil-filled transformer was located in this building at the time of the site inspection. Building 577 was constructed in 1956.

Building 603. This 10,700-square-foot building located on Parcel 50 has been used as a chapel. Building 603 was constructed in the 1960s. Interview information indicates that a railroad spur, which led to the air field east of this parcel, was formerly located where Building 603 is now located. According to site inspection data, Building 603 is

currently used as a chapel and Sunday school. The boiler room of this building was inaccessible during the site inspection.

Building 103 (demolished). This building, which was formerly located on Parcel 92, was used as officers' quarters. This building was demolished in the early 1990s. The construction date of this building is not known.

Building 104 (demolished). This building, which was formerly located on Parcel 97, was used as officers' quarters. This building was demolished by explosives between the late 1970s and early 1980s. The construction date of this building is not known.

Building 105 (demolished). This building, which was formerly located on Parcel 98, was used as officers' quarters. This building was demolished by explosives between the late 1970s and early 1980s. The construction date of this building is not known.

Building 106 (demolished). This building, which was formerly located on Parcel 99, was used as officers' quarters. This building was demolished by explosives between the late 1970s and early 1980. The construction date of this building is not known.

Building 108 (demolished). This building, which was formerly located on Parcel 91, was used as a warehouse and supply facility and as a mess hall. This building was demolished in the 1980s. The construction date of this building is not known.

Building 110 (demolished). This building, which was formerly located on Parcel 96, was used as officers' quarters. This building was demolished by explosives between the late 1970s and early 1980s. The construction date of this building is not known.

Building 506 (demolished). This one-story, 90-square-foot building was used as an electrical switch station. During the site inspection, only the concrete foundation associated with this building was present. Electrical utility conduits were noted to protrude from the foundation. Building 506 was constructed in 1938 and was demolished in the 1980s.

Building 526 (demolished). This building, which was formerly located on Parcel 69, was used as a swimming pool. Site inspection data indicate that the swimming pool has been filled with soil. The construction and demolition dates of Building 526 are not known.

Building 530 (demolished). This building, which was formerly located on Parcel 69, was used as a swimming pool bath house. The construction and demolition dates of Building 528 are not known.

Buildings in Former Medical/Dental Facilities (demolished). Several buildings were formerly located in the current Knolls Housing Area. These buildings were associated with the medical and dental facilities of the former hospital. These former buildings include: Building 522 - Combat Center Facility/Reserve Forces Operations Training/Operations Center; Building 523 - Heating Facility; Building 529 - Medical/Dental Storage/Hospital; Building 532 - Electrical Power Station/Electrical Emergency Power Plant; Building 534 - Surgical Nurse Unit/Hospital; Building 537 - OB Nurse Unit/Hospital; Building 538 - Headquarters; Building 539 - Water Storage Tank and Locational Beacon; Building 540 - Library/Transmitter; Building 541 - Medical Nurse Unit/Hospital; Building 542 - Medical Nurse Unit/Hospital; Building 545 - Headquarters/Child Care; Building 546 - Classroom/Nursery; Building 548 - Headquarters/Administrative Office; Building 554 - Quarters; Building 556 - Storage/Medical Equipment Supply/Mess Hall; Building 558 - Bus Shelter; and Building 560 - Quarters.

Unnumbered building (demolished). One unnumbered building was formerly located on Parcel 87. Based on a review of historical aerial photographs, this building was demolished prior to 1985. The construction date and the types of activities conducted at this building are not known.

Unnumbered buildings (demolished). Three unnumbered buildings formerly located on Parcel 85 were demolished in the 1950s. These buildings were potentially associated with an automobile service station that was formerly located at this parcel. The construction dates and the types of activities conducted at these buildings are not known.

Open Space. The open space in Zone D primarily consists of grassy landscaped areas, vehicle parking areas, material and drum storage, roadways, sidewalks, and recreation areas. The former amphitheater and the southeastern portion of Zone D contain areas overgrown with vegetation. Several concrete walkways observed during the site inspection indicate that buildings were formerly present at these locations. Large brush and vegetation piles were observed in the southeastern portion of the base in Parcels 98 and 99. Piles of construction debris were also noted on Parcels 96, 98 and 99. The construction debris piles are comprised of inert materials including concrete rubble, rebar, lumber, etc. Parcel 97 was reportedly used by the Sundt Corporation as a staging area during the construction of Capehart Housing. Parcel 85 was formerly used as a gas station. Evidence of use of Parcel 90 as a wash rack area was noted during the site inspection (a sign indicating "wash rack"). There is possibly an open drainage ditch running from Zone F through Parcels 96 and 91. A

total of four ground disturbances that may have been associated with former excavations were observed in Parcels 92 and 97.

Zone Issues

Parcel-specific BRAC classifications and environmental issues of concern for Zone D are presented within Table 4-3. Environmental issues of concern are discussed below. If no statement regarding the presence of staining or other evidence of potential release is made in the following subsections regarding areas of chemical storage, transformers, ASTs, work areas, etc., then no staining was noted during the site inspections.

According to RASO, radiological materials are not of concern at DODHF Novato. In addition, a base-wide statistical radon survey of DODHF Novato performed in 1991 concluded that radon concentrations were well below the EPA action level of four picocuries per liter. Of the 24 radon samples taken in the Knolls Housing Area, the average radon concentration was 0.97 picocuries per liter. No evidence of lead release issues, or ordnance storage or use were identified for Zone D.

The transformers located on Parcels 61, 67, 70, 84, 88, and 93 were visually inspected and showed no signs of release to the environment. Also, lead based paint and/or asbestos containing materials may be present on structures within Zone D; however, no signs of releases to the environment beyond typical weathering were noted during site inspections.

Chemical Storage

One 5-gallon container of gasoline and a larger built-in fuel tank (referred to in Table 7-D-2 as an AST) used as a fuel storage reservoirs for generators were noted in Building 549 (Parcel 67) during the site inspection. A stain was observed on concrete in the area of the generators. The size of the affected area was not noted. No breaks or seams in the concrete in the vicinity of the stain were noted.

Small quantities of general cleaning supplies and paint were stored in Buildings 115 (Parcel 88), 531 (Parcel 72), and 603 (Parcel 50) during the site inspections.

Chlorine was probably stored at Building 528 (Pool Chlorination House) on Parcel 69; however, the exact quantity of any such chemical

storage is unknown. No stressed vegetation indicating a release of chlorine to the environment was noted in the vicinity of Building 528 or elsewhere on Parcel 69.

Pesticide Use and/or Storage (Non-Routine)

A railroad spur formerly ran through Parcel 50 prior to the construction of the chapel. Railroad tracks historically received applications of pesticides beyond what would be considered routine pesticide management.

Potential Contamination Migration from Neighboring Parcels

A leaking UST at Parcel 67 has potentially impacted the soil and groundwater at adjacent parcels within the zone and in the vicinity of the suspected location of the tanks (Parcels 68, 71, 84, 85, and 88). Given the depth of detected contamination (2 to 3 feet bgs) and the relatively low concentration levels of contaminants, it is unlikely that this contamination has migrated beyond the perimeter of Parcel 67. In addition, this contamination would have been excavated at the time Parcel 67 was graded for the construction of the Knolls Housing. The former USTs and the areas of known contamination are located on the far east side of Parcel 67, approximately 1,000 feet away from the parcels bordering Parcel 67 to the east and north (Parcels 57, 60, and 63). Also, the potentially contaminated area of Parcel 67 is downgradient of these parcels.

Parcels 67, 88, and 89 have potentially been impacted by two USTs (Tanks 11A and 11B) that were removed from Parcel 85 in March 1992. A Draft Remedial Investigation/Feasibility Study (RI/FS) that addresses the former underground tanks on Parcel 85 has been completed and is pending comments and/or approval from the regulatory agencies.

Potential Historical Adverse Use

Based on a review of historical records and aerial photographs, numerous industrial/warehouse-type buildings were located on Parcels 67 and 68 prior to August 1991. The types of activities conducted at these buildings are not completely known. Buildings 522, 523, 529, 532, 534, 537, 538, 539, 540, 541, 542, 545, 546, 548, 554, 556, 558, and 560 were formerly located at these parcels, and were used for or associated with the former hospital on Parcel 67. The uses of these buildings included hospital-related storage, linen supply, heat generation, emergency power generator use, hospital, treatment and

diagnostic clinics, administrative offices, classrooms, and library. Buildings 510 and 525, which are still located on Parcel 67, were also formerly used for these purposes.

A railroad spur formerly ran through Parcel 50 prior to the construction of the chapel. These areas may have been impacted by historical releases of TPH, PCBs, creosote, and lead from rail cars and engines.

The wash rack sign located on a rear door of Building 111 (Parcel 90) did not appear to be associated with significant washing activities. No drains exist in the vicinity (inside or outside of the building), and no staining was observed. The area is paved, and the building layout suggests barrack or administrative use rather than industrial or maintenance.

Significant Staining

A stain was observed on concrete in the area of the generators in Building 549 (Parcel 67). The size of the affected area was not noted. No breaks or seams in the concrete in the vicinity of the stain were noted.

During visual inspections, oily stains and sheens were observed on the asphalt parking lot in Parcel 92. Oily sheens on standing water were observed on the bare soil roadway, near brush piles, and on grassy areas located on Parcels 97, 98, and 99. The oily puddles appeared to be associated with naturally occurring organics leaching from the brush/debris piles located in this area or with vehicle parking on Parcel 92.

Spills/Incidents With and Without Approved Cleanup

Petroleum hydrocarbons including jet fuel, kerosene, motor oil, diesel, and gas were spilled or released on Parcel 67 (reported in what document in January 1987). Analytical results of soil samples collected near former Buildings 522 and 532 revealed the presence of petroleum hydrocarbons in surface soils. Kerosene and jet fuel were detected at a concentration of 12 mg/kg, and motor oil was detected at a concentration of 70 mg/kg. Ten to fifteen feet of soil were removed from this area during the construction of the Knoll Housing in the mid-1980s.

Unconventional Building Demolition

Interview information indicates that Buildings 104 (Parcel 97), 105 (Parcel 98), 106 (Parcel 99), and 110 (Parcel 96) were demolished unconventionally. Explosives were reportedly used to demolish these buildings for a movie production. In addition, interviews indicate that painting contractors have recently used this area for dumping construction debris (e.g., wood, drywall, paneling).

Underground Storage Tanks (USTs)

USTs or suspected USTs are or were present on three parcels in Zone D: Parcels 67, 85, and 88. These UST issues are discussed below.

Parcel 67 USTs

Architectural plans (April 1985) and a Navy memorandum indicate that one UST is located near the former location of Building 522 (Combat Center Facility/Reserve Forces Operations Training/Operations Center) on Parcel 67. This 8,500-gallon tank was used to store fuel oil. It is unclear if this tank was removed or is still in place. Because 10 to 15 feet of elevation was graded off of Parcel 67 for the construction of the current housing complexes present, it is very likely that the tank has been removed. The area where Building 522 was formerly located is now occupied by housing units.

Interview information indicates that several underground heating oil tanks were removed from buildings on Parcel 67. No further information regarding the integrity, number, or locations of the tanks is known.

In a 1987 Hamilton Air Force Base (HAFB) study, Woodward-Clyde Consultants reported the collection of fourteen soil samples near former Building 522 (Combat Center Facility/Reserve Forces Operations Training/Operations Center) and former Building 532 (Heating Facility) on Parcel 67. Low-level concentrations of petroleum hydrocarbons, including jet fuel, kerosene, motor oil, diesel, and gasoline, were detected in three of the shallow soil samples collected from one to two feet below ground surface. The *Federal Facility PA Review Summary Report* (URS Consultants, 1992) suggests that the petroleum hydrocarbons detected in the three samples may have been due to spillage from UST filling operations near Buildings 522 and 532. According to the *Confirmation for Hazardous Wastes for HAFB*, kerosene and jet fuel were detected in one soil sample at concentrations of 12 mg/kg, and motor oil was detected at another

sample location at a concentration of 70 mg/kg. The URS report states that no additional sampling data are available for the housing facility.

Parcel 85 USTs

Two USTs (Tanks 11A and 11B) were formerly located north of San Pablo Avenue and west of Escolita Street (at the corner of 11th Street and Escolita Street) on Parcel 85. These 12,000-gallon tanks, which reportedly stored fuel oil, had been abandoned for approximately 20 years before they were removed in March 1992 by PRC. Vent lines were also removed; however, no underground product piping was associated with the tanks. During tank excavation activities, a "mild" hydrocarbon odor was detected. Both tanks appeared to be in good condition at the time of removal. The ballast pad was not removed due to difficulties associated with the presence of groundwater. As part of the subsurface investigation associated with Tanks 11A and 11B, four soil samples were collected from the sidewalls of the excavation and analyzed for BTEX, TPH-purgeables, and TPH-extractable. TPH-motor oil, TPH-unknown, ethylbenzene, and total xylenes were detected in the soil at maximum concentrations of 5,500 mg/kg, 8.5 mg/kg, 0.012 mg/kg, and 0.048 mg/kg, respectively. These concentrations of ethylbenzene and xylene in soil samples are well below the December 1994 EPA Preliminary Remediation Goals (PRGs) for soil. Benzene, toluene, TPH-purgeables (as gasoline), TPH-extractables (as jet fuel), and TPH-extractables (as unknown hydrocarbon) were not detected above detection limits in any of the soil samples.

In addition to the soil samples, one groundwater sample was collected from the groundwater encountered during the excavation; this groundwater sample was also analyzed for BTEX, TPH-extractables, and TPH-purgeables. Benzene, toluene, ethylbenzene, total xylenes, and TPH-purgeables(as gasoline), TPH-extractables (as motor oil), and TPH-extractables (as unknown hydrocarbon) were detected in the groundwater sample at maximum concentrations of 0.023 mg/L, 0.43 mg/L, 0.15 mg/L, 1.8 mg/L, 8.8 mg/L, 17 mg/L, and 6.6 mg/L, respectively. No TPH-purgeables (as unknown hydrocarbon) or TPH-extractables (as jet fuel) were detected above the detection limits in the groundwater sample. Four composite samples were also collected from the spoils pile and analyzed for BTEX, TPH-purgeables, and TPH-extractables. Benzene, toluene, ethylbenzene, total xylenes, and TPH-purgeables (as unknown hydrocarbons) were detected in the soil samples collected from the spoils pile at maximum concentrations of 0.02 mg/kg (estimate), 0.027 mg/kg (estimate), 0.033 mg/kg (estimate), 0.14 mg/kg (estimate), and 13 mg/kg (estimate), respectively. TPH-purgeables (as gasoline), TPH-extractables (as diesel), and TPH-extractables (as motor oil) were not detected above detection limits.

According to PRC's report, field observations and analytical results (elevated concentrations of TPH-extractables [as motor oil], TPH-purgeables [as unknown hydrocarbon], ethylbenzene, and xylenes in a sample collected from the southeast sidewall of the excavation) suggest that the probable source of contamination was a leak from the southeastern end of Tank 11B on Parcel 85. Although the tanks reportedly stored fuel oil, analytical results suggest that several fuels, including jet fuel, fuel oil, motor oil, and gasoline, may have been stored in Tanks 11A and 11B. PRC has recommended further study of this UST removal site to define the extent of soil and groundwater contamination.

A second subsurface investigation (ERM, 1994) to further define the extent of soil and groundwater contamination around the excavation site of former Tanks 11A and 11B on Parcel 85 has been completed. Eighteen groundwater samples and 34 soil samples were collected in late 1994 and early 1995. In addition, three monitoring wells were installed. Six soil samples and three groundwater samples were collected and analyzed for TPH-gasoline, TPH-diesel, and BTEX. TPH-gasoline, benzene, toluene, ethylbenzene, and xylenes were detected in the Geoprobe soil samples at maximum concentrations of 4 mg/kg, 0.013 mg/kg, 0.03 mg/kg, 0.03 mg/kg, and 0.088 mg/kg, respectively.

Ground water samples collected from the same borings contained TPH-gasoline, benzene, toluene, ethylbenzene, and xylenes at maximum concentrations of 4 mg/L, 0.013 mg/L, 0.0085 mg/L, 0.001 mg/L, and 0.036 mg/L, respectively. No TPH-diesel was detected above detection limits in the soil or groundwater samples. Soil samples collected from the three monitoring wells contained TPH-gasoline, TPH-diesel, benzene, toluene, ethylbenzene, and xylenes at maximum concentrations of 5.4 mg/kg (C6 - C12 range), 17 mg/kg, 0.0063 mg/kg, 0.025 mg/kg, 0.037 mg/kg, and 0.061 mg/kg, respectively. No lead was detected above detection limits. Ground water samples collected from the three monitoring wells contained iron and magnesium at maximum concentrations of 87 mg/L, and 2,000 mg/L, respectively. No TPH-gasoline, TPH-diesel, kerosene, motor oil, lead, benzene, toluene, ethylbenzene, or total xylenes were detected above detection limits in any of the groundwater samples collected from the monitoring wells. This subsurface investigation was still in progress at the time of this writing. A Draft Remedial Investigation/Feasibility Study that addresses the former underground tanks on Parcel 85 has been completed and is pending comments and/or approval by the regulatory agencies.

Parcel 88 UST

According to the *Underground Storage Tank Removal and Preliminary Investigation DRAFT Final Summary Report* (PRC, 1992), one UST (Tank 115) reportedly existed between Building 115 and San Pablo Avenue on Parcel 88. This 250-gallon (estimate) tank was reportedly used to store fuel oil for a boiler located within Building 115. Although Ground Penetrating Radar (GPR) was used to survey and identify two suspect tank locations, no tank was found at either location. The PRC report suggests that it is probable that Tank 115 was removed previously; however, no tank removal records exist (the report outlines an area from which Tank 115 was most likely removed). No soil or groundwater samples were collected from the suspect area. Under the direction of Mr. Tim Underwood, Marin County Office of Waste Management, no further investigation was performed by PRC at this site.

Utilities

Parcels 58, 61, 63, 67, 68, 70, 72, 85, 87, 88, 89, 90, 91, 92, and 93 in Zone D have potentially been impacted by the sanitary sewer line leading from the historical medical facilities and/or off-site properties.

Other

Two old MEK containers (empty) were observed on Parcel 71 during the site inspection. The containers did not appear to be associated with any activities in the vicinity, which is a residential area. No sign of release of the contents of these containers (e.g., stressed vegetation, odors, or sheen) was evident.

New asphalt and/or gravel noted on Parcels 92 and 97 during site inspections was later determined to be the result of patching efforts due to the historical use of these parcels as heavy equipment staging areas.

Summary

In summary, data gaps regarding potential contaminant migration from neighboring parcels, potential historical adverse use, spills and incidents, significant staining, unconventional building demolition, USTs, underground sanitary sewer lines, and other issues at Parcels 50, 58, 61, 63, 67, 68, 70, 71, 72, 84, 85, 87, 88, 89, 90, 91, 92, 93, 96, 97, 98, and 99

still exist. These issues must be resolved before these parcels can be reclassified from BRAC Category 7 to another BRAC category.

Parcel 51 has received written agency concurrence as a BRAC Category 1 parcel. Parcels 57 and 60 have received verbal agency concurrence as BRAC Category 1 parcels. Descriptions of recommended CERFA-eligible parcels that have not received written agency concurrence are provided in Section 5 of this document. Also, Parcel 69 has received verbal concurrence as a BRAC Category 2 parcel.

Environmental issues such as asbestos, lead-based paint, and oil-filled electrical equipment need to be sampled for and/or disclosed in accordance with DOD policy, but do not affect BRAC classifications.

ZONE E

Zone E, the Former Runway and Recreational Zone, is 32 acres in size and consists of Parcels 107, 108, 110, 111, 112, 114, 115, and 117. Zone E is located in the southeastern portion of the primary base at DODHF Novato. Per the August 15, 1995, BCT meeting, Parcel 117 has received verbal agency concurrence as a BRAC Category 1 parcel.

Zone E is bounded to the west by Spanish Housing (Zone F) and to the north by the Knolls Housing and Recreational Zone (Zone D). Agricultural land borders the zone to the south. The Aircraft Maintenance Area of Hamilton Army Air Field borders Zone E to the east.

Zone Use and History

Currently, four buildings (Buildings 191, 193, 196, and 251) and four baseball fields with associated bleachers, backstops, dugouts, concession stands, scoreboards, and announcers' booths occupy approximately five percent of Zone E. The remaining 95 percent of the zone is open space and can be classified into three distinct open space areas: the Western Open Space (located west of Caliente Real on Parcel 108), the Southern Open Space (located on the southwest side of Parcel 115), and the Eastern Open Space (located on the northeast side of Parcel 115). Approximately 10 percent of the zone open space is covered by roadways, former taxiways, or parking areas paved with asphalt or concrete. A drainage ditch containing marsh vegetation flows between two paved roadways (former taxiways) that cross Parcel 115 from northwest to southeast.

Zone E historically and currently consists of wooded hill slopes, open grass areas, baseball fields, and aircraft taxiways and parking areas associated with the adjacent airfield. The recreation areas were historically used by the occupants of approximately 20 former barracks buildings located on the adjacent Army facility east of Caliente Real and north of Lido Road. The barracks were demolished in the late 1960s. The baseball fields are currently used by Little League teams. The aircraft parking areas consist of four concrete "driveways" on Parcel 115 connecting to a former taxiway that forms the current roadway joining Caliente Real near Building 251. The aircraft parking areas are currently abandoned and overgrown. No airplanes appeared in these parking areas in any of the aerial photographs reviewed

during the EBS. The southern end of Parcel 115 has been used as a disposal area for landscaping and construction debris (concrete rubble, rebar, etc.).

Listings of current and former buildings and structures in the zone, as well as their parcel-specific locations, are provided in Tables 4-1 and 4-2. More detailed information regarding the specifications and uses of current and former buildings is presented below. The building descriptions are ordered by parcel number.

Building 251. This is an approximately 200-square-foot concrete building that houses a transformer and four dry switches on Parcel 110. No evidence of leaking or staining was noted during the site investigation. No other information is available for this building.

Building 191. This is a 1,200-square-foot, one-story windowless concrete block building on Parcel 112 with corrugated metal roofing and a concrete foundation. The building is equipped with two large roof vents, heavy steel doors, and loading docks. Building 191 could not be accessed during the site inspection so its current contents and use are unknown. The building was constructed in 1934, and was formerly used as a magazine for storage of arms and ammunition. An empty 5-gallon container of denatured alcohol (Solvoil) was observed beneath the loading dock on the east side of the building.

Building 193. This is a 120-square-foot, single-story windowless brick building on Parcel 114 with a wood-frame roof and a concrete floor. A heavy steel door and a small vent are present on the east side of the building. The building, which currently contains three rusted one-gallon containers of paint, is in good condition. Empty boxes for new baseballs and other debris in the building indicate that it is currently used for storage of equipment for the adjacent baseball fields. This small building was constructed between 1932 and 1946 and was formerly used as a transformer vault and switch station as well as an arms and ammunition storage building.

Building 196. This is a 144-square-foot, single-story wooden building with a wood-frame roof on Parcel 117. According to interviews with PWC personnel, the building was formerly used as a golf driving range at another location prior to being moved to its present location. The building is currently partially demolished; the western wall has been knocked out.

Western Open Space. This area west of Caliente Real covers approximately 16 acres and is contained in Parcels 107, 108, and 110. The western half of this area consists of a wooded slope. The eastern half is an open grassy area containing a small transformer building, a

paved parking lot, and two baseball fields with associated structures. A pile of rubbish approximately 10 feet in diameter has been dumped in the southern portion of this area. One building of unknown use was formerly located on Parcel 107. The Western Open Space was initially developed in the 1930s as a recreational area associated with the adjacent air field.

Southern Open Space. This area covers approximately 11 acres on the southwest side of Parcel 115 and includes open space surrounding the building on Parcel 117. The area is bounded on the northeast by a drainage ditch. Approximately 15 percent of the Southern Open Space consists of paved roadways formerly used as taxiways and aircraft parking areas. The unpaved areas are not maintained and are covered by tall grass, weeds, and brush. The southern end of the open space has recently been used as an area for disposal of landscaping and construction debris, including leaves, wood chips, palm fronds, soil, logs, scrap lumber, asphalt, and concrete. A pile of scrap lumber approximately 25 feet in diameter is also present on the pavement immediately northwest of Parcel 117. The former aircraft and parking areas in this open space were developed in the 1930s during the construction of the adjacent air field.

Eastern Open Space. This area covers approximately five acres on the northeast side of Parcel 115 and includes Parcel 111 and open space surrounding buildings on Parcels 112 and 114. The open space is bounded by Lido Road to the north, Burma Road to the east, a paved roadway to the south, and a drainage ditch to the west. Fifteen percent of the space is covered by paved roadways, some of which were formerly used as taxiways and aircraft parking areas. The rest of the space is an open grassy area containing Buildings 191 and 193 (previously described) and two baseball fields with associated structures. Several piles of soil, gravel, and debris, including concrete and corrugated metal, are present on the northeast and northwest corners of Parcel 111. One building of unknown use was formerly located on Parcel 111. Underground utility conduits are exposed in a drainage ditch along the north side of Parcel 111 at the location of a former bridge crossing. The Eastern Open Space was initially developed in the 1930s as a recreational area associated with the adjacent air field.

Zone Issues

Parcel-specific BRAC classifications and environmental issues of concern for Zone E are presented within Table 4-3. Environmental issues of concern are discussed below. If no statement regarding the

presence of staining or other evidence of potential release is made in the following subsections regarding areas of chemical storage, transformers, ASTs, work areas, etc., then no staining was noted during the site inspections.

According to RASO, radiological materials are not of concern at DODHF Novato. A base-wide radon survey of DODHF Novato performed in 1991 concluded that radon concentrations were well below the EPA action level of four picocuries per liter. No evidence of ASTs, current or former lead release issues, potential historical adverse use, spills/incidents with and without approved cleanup, unconventional building demolition, USTs, or industrial hygiene issues was identified for Zone E. Note that Building 191 (Parcel 112) could not be accessed during the site visit.

The transformers located on Parcels 108, 110, and 115 were visually inspected and showed no signs of release to the environment. Also, lead based paint and/or asbestos containing materials may be present on structures within Zone E; however, no signs of releases to the environment beyond typical weathering were noted during site inspections.

Hazardous Waste Generation and/or Storage

Approximately two quarts of waste motor oil were present in a container in the debris disposal area on the southern end of Parcel 115. A sheen was noted on standing water nearby. No other evidence of hazardous waste generation and/or storage in Zone E was identified; the discarded container of oil is not representative of the debris located on this disposal area.

Potential Contamination Migration from Neighboring Parcels

The Aircraft Maintenance Area of Hamilton Army Air Field borders Parcels 111, 112, 114, and 115 in Zone E. Compounds detected in soil, groundwater, or storm sewer sediment in previous investigations of the Aircraft Maintenance Area have included petroleum hydrocarbons, lead and other metals, and halogenated and nonhalogenated organic compounds. The extent of impacts from the air field are not known; however, migration, if any, is expected to be in the downgradient direction toward the east and south (away from Zone E). Sampling results depicted on Figures 4.19B and 4.20 of the Final Environmental Investigation Report, Volume I (Engineering-Science, Inc., July 1993) indicate that compounds of concern are not migrating from the Aircraft Maintenance Area towards Navy property.

Utilities

Potentially contaminated sanitary sewer lines are present beneath Zone E. The sanitary sewer lines, including a force main, are potentially contaminated from upstream sources, including Hamilton Army Air Field (affecting Parcels 111, 112, and 115) and a former medical facility on Parcel 67 (affecting Parcels 107, 108, 110, and 115).

Potentially contaminated storm sewer lines and drainage ditches are present in Zone E. These lines and ditches are potentially contaminated from upstream releases from the Hamilton Army Air Field Aircraft Maintenance Area (affecting Parcels 111, 112, and 115).

Other

Several former USTs were located on Parcel 67 prior to the construction of the Knolls Housing. Soil samples collected in the vicinity of the USTs indicated that low concentration levels of petroleum hydrocarbons were present in shallow soils. The top 10 to 15 feet of soil in this area was excavated during the construction of the Knolls Housing, and some of these soils were reportedly used as fill in Parcel 108. Construction practices in the mid-eighties would have prohibited the use of contaminated soils for this purpose. Additional evaluation of construction documents associated the Knoll Housing (if available) is recommended. After this research has been performed, a sampling approach will be developed if warranted; no sampling is proposed for this location at this time.

Summary

In summary, data gaps still exist for Parcels 107, 108, 110, 111, 112, 114, and 115 due to potential impacts from sanitary sewers, storm sewers and/or drainage ditches, potential migration onto parcels, and potentially contaminated fill. These issues must be resolved before these parcels can be reclassified from BRAC Category 7 to another BRAC category.

As previously noted, Parcel 117 has received verbal agency concurrence as BRAC Category 1. Descriptions of recommended CERFA-eligible parcels that have not yet received written agency concurrence are provided in Section 5 of this document.

Environmental issues such as asbestos, lead-based paint, and oil-filled electrical equipment need to be sampled for and/or disclosed in accordance with DOD policy, but do not affect BRAC classifications.

ZONE F

Zone F, the Spanish Housing Zone, is 185.9 acres in size and consists of Parcels 56, 66, 74, 75, 77-83, 86, 94, 95, 100-106, 109, 113, 116, and 118-122. Of these, Parcels 75, 77, 78, 79, 82, 94, 100, 106, 109, 113, 118, 119 and 120 have received written concurrence from the state on their CERFA status. Parcels 74, 101, and 103 have received verbal agency concurrence as CERFA-eligible parcels per the August 15, 1995, BCT meeting and/or the October 4, 1995 BCT site walk. Parcels 83, 102, and 116 have received verbal agency concurrence as BRAC Category 2 parcels (the state has requested that the inactive transformer on Parcel 83 be removed).

Zone F is located in the southeastern portion of the primary base at DODHF Novato. It is bounded by the Former Runway and Recreational Zone (Zone E) to the east, vacant wetlands and Capehart Housing (Zone G) to the west, the Knolls Housing and Recreational Zone (Zone D) to the north, and by off-site US Army property to the south.

Zone Use and History

Buildings within Zone F have been used as housing, recreational, and support facilities. The primary tenant of this area has been Military Housing. Currently, 106 houses and 22 other buildings are present within Zone F. Listings of current and former buildings and structures in the zone, as well as their parcel-specific locations, are provided in Tables 4-1 and 4-2. Detailed information regarding the specifications and uses of current and former buildings is presented below; utility buildings are presented first, and other buildings are presented last. Within each grouping, the building descriptions are ordered by parcel number.

Residential Buildings. The residential buildings located in Zone F consist of single, and multi-family housing units. The units are of a "Spanish Style" architecture and were constructed in the 1930s. This area was formerly undeveloped.

Buildings 225, 231, 241, 247, 261, 273, 279, 295, 518, 519, and 564. These buildings are utility vaults present throughout the zone. Each of these buildings is its own parcel. The buildings have concrete block walls and concrete floors and are typically 214 square feet in size (although Buildings 225 and 279 are 247 square feet and 182 square feet in size,

respectively). These buildings typically house one operating 25, 37.5 or 50 kVA transformer. Building 564 contains one active transformer and one inactive transformer. Building 279 contains one active transformer, one inactive transformer, and six dry electrical switches. The transformers in Buildings 273 and 295 appeared to have corroded bases. Slight staining was observed on the floor of Building 518.

Building 550. This one-story, 123-square-foot, single-story building located on Parcel 56 has been used as rest rooms for the adjacent picnic area and a traffic check house. This building was constructed in 1933. The building has no known former uses.

Building 551. This is a 310-square-foot, single-story building on Parcel 66 that has been used as a gas meter facility and electrical switch station. This building was constructed in 1933. The building has no known former uses.

Building 552. This is a 645-square-foot, single-story building on Parcel 66 used as a gas meter house and electrical switch house. This building was constructed in 1933. From 1986 through 1991, this building was used as a staging area for storing PCB-containing transformers that were subsequently removed from the site. The transformers ranged in size from 10 to 64 kVA. Analytical results of oil samples collected from the transformers ranged from less than 1 part per million (ppm) to 209 ppm PCBs. No evidence of staining was noted during the site inspection.

Building 201. This is a 21,328-square-foot, three-story building on Parcel 95. It was constructed in 1934. The building has been used for housing and Bachelor's Officers' quarters. This building may potentially be included in the National Register of Historic Places.

Building 227. This is a 18,600-square-foot building that serves as a child care center on Parcel 101. It was constructed in 1966. The building has also served as a Sunday school, personal services, offices, living quarters, and Bachelor's Officers' quarters.

Building 204. This is a 1,064-square-foot building located on Parcel 102. It was constructed in 1938. The building has served as a swimming pool bathhouse and has undergone extensive remodeling.

Building 205. This is a 7,200-square-foot building located on Parcel 102. It was constructed in 1935. The building has served as a swimming pool or water supply storage. On one map, the swimming pool is indicated as a "tank". The tank outline corresponds exactly with the dimensions of the pool. There is no other evidence to suggest that the pool was ever used to hold anything but water. The "tank" notation is

likely a mistake on the figure. This building may potentially be included in the National Register of Historic Places.

Building 208. This is a 150-square-foot, single-story building that houses the heating system for the pool on Parcel 102. It was constructed in 1962. The building houses a natural gas-powered heating unit.

Building 206. This building was used as a mess hall and recreation lounge. It was constructed in 1944. The building is located on Parcel 103.

Building 209. This is a 624-square-foot, single-story building that houses the swimming pool water treatment system on Parcel 102. The building was constructed in 1934. The facilities in this building include two 5-foot diameter vertical tanks and miscellaneous piping and pumps. Chemical storage within this building includes six 5-gallon containers of liquid chlorine.

Building 203. This is a 22,294-square-foot building used as the community center, library, special services office, and Officers' Club on Parcel 104. There is visual evidence that an underground steel tank may be present along the south side of the building. A portion of this tank is visible above the ground surface.

Buildings 579, 581, 583, and two unnumbered buildings (demolished). Building 579 on Parcel 77 was used as a youth center and exchange store. Building 581 on Parcel 78 was used as a youth center, school, and Air Force Division Headquarters. Building 583 on Parcel 79 was used as a nursing school and thrift shop. Historical aerial photographs revealed one unnumbered building on Parcel 80 and one unnumbered building on Parcel 100; these buildings are no longer present, and no other information about these buildings was obtained.

Open Space. Exterior areas at Zone F consist primarily of asphalt-paved areas (5 percent), landscaped areas (20 percent), and grassy undeveloped areas (75 percent). The open space currently and historically has been undeveloped land or landscaped yards for Spanish Housing. Construction debris was observed to be present on some parcels at DODHF Novato. Where it is present, the debris consists of broken concrete, dirt, rebar, and used lumber. This debris is not an environmental concern.

Zone Issues

Parcel-specific BRAC classifications and environmental issues of concern for Zone F are presented within Table 4-3. Environmental issues of concern are discussed below. If no statement regarding the presence of staining or other evidence of potential release is made in the following subsections regarding areas of chemical storage, transformers, ASTs, work areas, etc., then no staining was noted during the site inspections.

According to RASO, radiological materials are not of concern at DODHF Novato. A base-wide radon survey performed in 1991 concluded that radon concentrations were below the EPA action level of four picocuries per liter at DODHF Novato. In addition, a radon survey was conducted in the Spanish Housing area. The results indicated that 16 samples collected in this area contained an average of 0.83 picocuries per liter. No evidence of current or former ASTs, lead release issues, ordnance storage or use, spills or incidents without approved cleanup, significant staining, or unconventional building demolition, was identified for Zone F.

The transformers located on Parcels 66, 104, and 105 were visually inspected and showed no signs of release to the environment. Also, lead based paint and/or asbestos containing material may be present on structures within Zone F; however, no signs of releases to the environment beyond typical weathering were noted during site inspections.

Chemical Storage

Three 5-gallon cans of electrical insulating oil and an inactive oil-filled transformer were located in Building 552 (Parcel 66). An inactive oil-filled transformer was also located in Building 564 (Parcel 83). Inactive oil-filled transformers are considered a form of chemical storage. No staining was noted in either building. Building 552 is addressed later in this ZAS in the discussion on oil-filled equipment.

Minor quantities of cleaning supplies, latex paint, and wood preservative have been kept in storage rooms in Building 227 (Parcel 101). No evidence of release was noted in these areas of Building 227. However, minor staining was noted on the floor of the boiler room. Because the extent and severity of the staining was minor, no sampling is necessary at this location. Chlorine is stored in Building 205 (Parcel 102), but no staining or stressed vegetation was noted in the vicinity.

Hazardous Waste Generation and/or Storage

Oil-filled electrical transformers were formerly stored on Parcel 66, prior to their off-site disposal. The storage of oil-filled transformers is described in more detail later in this subsection in the discussion on oil-filled electrical equipment.

Six 1-gallon plastic containers of waste oil were located behind housing units 213 and 214 on Parcel 105. This appeared to be a minor, one-time occurrence and no staining was observed during the site inspection.

Potential Contamination Migration from Neighboring Parcels

Agency comments on previous EBS submittals have raised concerns regarding potential contamination migration from an Army work area on the adjacent Army property north of Parcel 56. No impacts from adjacent property were noted in site walks of this parcel, and adjacent Army structures do not appear to be industrial or maintenance-related buildings.

Potential contamination migration from former USTs on Parcel 67 in adjacent Zone D is a potential issue for Parcels 86 and 105. Given the depth of detected contamination (2 to 3 feet bgs) and the relatively low concentration levels of contaminants, it is unlikely that this contamination has migrated beyond the perimeter of Parcel 67. In addition, this contamination would have been excavated at the time Parcel 67 was graded for the construction of the Knolls Housing.

Pesticide Use and/or Storage (Non-Routine)

A former railroad spur was located on the northernmost portion of Parcel 105. Railroad tracks historically received applications of pesticides beyond what would be considered routine pesticide management.

Potential Historical Adverse Use

As noted above, a former railroad spur was located on the northernmost portion of Parcel 105. Historical releases of TPH, PCBs, creosote and lead from rail cars and engines may have impacted this area.

Oil-Filled Electrical Equipment

Three transformers with PCB fluid concentration greater than 5 ppm are currently located in the Zone (Parcel 66). From 1986 through 1991, Parcel 66 was reportedly used as a staging area for storing PCB-containing transformers that were subsequently removed from the site. The transformers ranged in size from 10 to 64 kVA. Analytical results of oil samples collected from the transformers ranged from less than 1-ppm to 209-ppm PCBs. No evidence of staining was noted during the site inspection. The state has requested that the inactive transformer located on Parcel 83 be removed for the parcel to receive BRAC Category 2 status.

Underground Storage Tanks (USTs)

One UST is currently known to exist at Zone F. This UST is located along the south side of Building 203 in Parcel 104. No other information about this tank was available.

Several unidentified pipes were noted adjacent to Building 201 on Parcel 95. It is suspected that these may be fill pipes associated with an UST.

Utilities

Parcels 80, 81, 86, and 105 contain sanitary sewer lines that are downgradient from lines on Parcel 67. Historically, Parcel 67 contained buildings used for medical and dental activities. Because of the lack of more specific information concerning the historical use of Parcel 67, the sanitary sewer lines represent a potential environmental hazard to Parcels 80, 81, 86, and 105.

Other

Several former USTs were located on Parcel 67 prior to the construction of the Knolls Housing. Soil samples collected in the vicinity of the USTs indicated that low concentration levels of petroleum hydrocarbons were present in shallow soils. The top 10 to 15 feet of soil in this area was excavated during the construction of the Knolls Housing, and some of these soils were reportedly used as fill in Parcels 105, 121, and 122. Construction practices in the mid-eighties would have prohibited the use of contaminated soils for this purpose.

Summary

In summary, data gaps regarding chemical storage (transformers on Parcel 66), USTs, sanitary sewer lines, pesticide use, potential contamination migration, potential historic adverse use (former railroad tracks), and possible contaminated fill at Parcels 56, 66, 80, 81, 86, 95, 104, 105, 121 and 122 still exist. These issues must be resolved before these parcels can be reclassified from BRAC Category 7 to another BRAC category.

Parcels 75, 77, 78, 79, 82, 94, 100, 106, 109, 113, 118, 119 and 120 have received written concurrence from the state on their CERFA status. Parcels 74, 101, and 103 have received verbal agency concurrence as CERFA-eligible parcels per the August 15, 1995, BCT meeting and/or the October 4, 1995 BCT site walk. Descriptions of recommended CERFA-eligible parcels that have not yet received written agency concurrence are provided in Section 5 of this document. Parcels 83, 102, and 116 have received verbal agency concurrence as BRAC Category 2 parcels (the state has requested that the inactive transformer on Parcel 83 be removed).

Environmental issues such as asbestos, lead-based paint, and oil-filled electrical equipment need to be sampled for and/or disclosed in accordance with DOD policy, but do not affect BRAC classifications.

ZONE G

Zone G, which is known as Capehart Housing, is 104.3 acres in size, and consists of Parcels 52, 53, 54, 55, 64, 65, 73, 76, 123, and 124. Parcel 123, which includes Building 3131 and a large water storage tank, was previously thought to be part of the primary base at DODHF Novato; however, this parcel is the property of Marin County and will not be investigated further. Parcels 52 and 53 have received written agency concurrence as BRAC Category 1 parcels. Per the August 15, 1995, BCT meeting, Parcels 73 and 76 have received verbal agency concurrence for BRAC Category 1 classification, and Parcel 124 has received verbal agency concurrence for BRAC Category 2 classification.

Zone G is bounded by off-base housing and undeveloped property to the south and west (Parcels 904, 905, 906, and 907); railroad tracks (Parcel 916) and farmland (Parcel 903) to the east; and by the Naval Exchange (Zone B), Air Force Triangle (Zone C), and off-base housing (Parcel 908) to the north.

Zone Use and History

Buildings within Zone G have been used as residential housing and administration. In addition, the main entrance to DODHF Novato and a water tank are located in this zone. The primary tenants of this area have been Navy personnel and their families.

Currently, over 200 residential buildings, one administrative building (Building 1000), one main entrance gate (Building 1100), one sewage lift station (Building 3132), and several structures (playground, water tank, five satellite dishes, utility vaults, sheds, lookout tower, and a subterranean concrete structure for a water main) are located on Zone G. A shed labeled "S-982" was observed between two water utility vaults on Parcel 55; this shed was formerly used to house chlorine tanks and chlorine treatment. Building 993 was formerly located on Parcel 55; its former use is unknown.

Listings of current and former buildings and structures in the zone, as well as their parcel-specific locations, are provided in Tables 4-1 and 4-2. More detailed information regarding the specifications and uses of current and former buildings is presented below. The description of residential buildings is presented first. Additional building descriptions are ordered by building number.

Residential Buildings. The residential buildings located in Zone G are typically single-story and double-story multi-family housing units and are currently in use. These buildings were constructed in the late 1950s and early 1960s. The area occupied by residential housing was formerly undeveloped.

Building 1000. This building is known as the administration housing office. It is a single-story building located on Parcel 54 and is approximately 5000 square feet in size. The building is currently used for offices and garden and maintenance storage. The building was constructed in 1948 and has had no former uses.

Building 1100. This building is the main entrance gate to DODHF Novato and was formerly a secured entry. It is a 320-square-foot, single-story building located on Parcel 52. The building is no longer in use. The building was constructed in 1949 and has had no other former uses.

Building 3132. Building 3132 is a sanitary sewer pump station located on Parcel 124. A generator with an aboveground storage tank is used for backup power at the pump station. Two drums were observed at the pump station. One of the drums was labeled "Flow Mate," while the other one was unlabeled and was probably empty. The pump station was constructed in 1960 and has served no other purpose.

Open Space. The open space area at Zone G consists primarily of 80 percent grass, 15 percent asphalt, and five percent concrete. The open space is currently used for residential purposes and for hiking and access roads on the grassy hillsides. There are five satellite dishes located in the center of the zone, and a water tank is located in the southwest portion of the zone. In addition, an open concrete drainage ditch runs throughout the grassy hillside in the center of the zone. The open space was undeveloped until the early 1960s.

Zone Issues

Parcel-specific BRAC classifications and environmental issues of concern for Zone G are presented within Table 4-3. Environmental issues of concern are discussed below. If no statement regarding the presence of staining or other evidence of potential release is made in the following subsections regarding areas of chemical storage, transformers, ASTs, work areas, etc., then no staining was noted during the site inspections.

According to RASO, radiological materials are not of concern at DODHF Novato. A base-wide statistical radon survey of DODHF Novato performed in 1991 concluded that radon concentrations were below the EPA action level of four picocuries per liter. No evidence of ordnance storage or use, potential historical adverse use, unconventional building demolition, spills or incidents without approved cleanup, significant staining, or USTs was identified for Zone G.

Transformers located on Parcels 54, 65, 73 and 76 were visually inspected and showed no signs of release to the environment. Also, lead based paint and/or asbestos containing materials may be present on structures within Zone G; however, no signs of releases to the environment beyond typical weathering were noted during site inspections.

Chemical Storage

This zone has historically been used for housing and administration purposes. On the west side of Building 1000 on Parcel 54, a 5-gallon container of lubrication oil was noted on bare soil, and an odor of turpentine was noted to emanate from a flammable storage locker located on a concrete patio. Aside from the noted odor, no other evidence of release was noted in this area.

Chlorine was previously stored in the shed formerly used for water treatment on Parcel 55. No stressed vegetation was identified during a site inspection of this parcel.

Minor or insignificant chemical storage was noted on Parcel 124. Parcel 124 is a sewer pumping station and contains a generator with a storage reservoir for fuel and a 55 gallon drum of "Flow Mate". No evidence of leaks or stains was noted on Parcel 124.

Potential Contamination Migration from Neighboring Parcels

Contaminants have potentially migrated from leaking gasoline and waste oil USTs formerly located in Parcel 29, north of Zone G and adjacent to Parcels 55 and 65. Impacts to soil and groundwater associated with this issue will be addressed by DODHF Novato's UST Program.

Utilities

Potentially contaminated storm sewer lines are present in Parcels 55 and 64. The storm sewer lines are potentially contaminated from an upstream source at the gasoline service station on Parcel 29.

Aboveground concrete ribbon storm drains exist on Parcels 73 and 76.

Other

The creek on Parcel 64 may have been affected by drum storage on adjacent Parcel 907. An empty 55-gallon drum and other empty containers (including an antifreeze container) were located along the western bank of the creek.

Summary

In summary, data gaps regarding chemical storage, potential contamination migration from neighboring zones, and storm sewers at Parcels 54, 55, 64, and 65. These issues must be resolved before these parcels can be reclassified from BRAC Category 7 to another BRAC category. Parcel 123 was thought to be part of the primary base at DODHF Novato; however, this parcel is the property of Marin County.

Parcels 52 and 53 have received written agency concurrence as BRAC Category 1 parcels. Per the August 15, 1995, BCT meeting, Parcels 73 and 76 have received verbal agency concurrence for BRAC Category 1 classification. Descriptions of recommended CERFA-eligible parcels that have not yet received written agency concurrence are provided in Section 5 of this document. Also, Parcel 124 has received verbal agency concurrence for BRAC Category 2 classification.

Environmental issues such as asbestos, lead-based paint, oil-filled electrical equipment, and the presence of an aboveground storage tank need to be sampled for and/or disclosed in accordance with DOD policy, but do not affect BRAC classifications.

ZONE H

Zone H, the Rafael Village Zone, is 107 acres in size and consists of Parcels 125, 126, 127, and 128. Parcels 125, 127, and 128 have received written agency concurrence as BRAC Category 1 parcels.

Zone H is located approximately one-half mile northwest of the primary base at DODHF Novato, and is separated from the primary base at DODHF Novato by Highway 101. It is in a valley surrounded by undeveloped areas and residential and light commercial properties, including a golf course and country club community.

Zone Use and History

The zone currently contains a 500-unit housing development of single- and multi-family homes built in approximately 1955. The development also includes a Karate center, which was formerly used as an exchange store, community center, and self-service laundry (Building 4041). The area was formerly undeveloped agricultural land.

Listings of current and former buildings and structures in the zone, as well as their parcel-specific locations, are provided in Tables 4-1 and 4-2. Approximately 85 percent of the zone is open space consisting of open grassy areas, several playgrounds, paved roadways and driveways, and a landscaping contractor's staging area. The landscapers' staging area on Parcel 126 includes a concrete slab floor that was formerly the foundation of a demolished storage shed (Building 1098). Former Building 1098 was used as a garden shack for lawn equipment storage. A steel roll-off storage trailer used by the landscaping contractor is present on the parcel. The storage trailer is reported to be used for equipment storage.

Zone Issues

Parcel-specific BRAC classifications and environmental issues of concern for Zone H are presented within Table 4-3. Environmental issues of concern are discussed below. If no statement regarding the presence of staining or other evidence of potential release is made in the following subsections regarding areas of chemical storage, transformers, ASTs, work areas, etc., then no staining was noted during the site inspections.

According to RASO, radiological materials are not of concern at DODHF Novato. A base-wide radon survey of DODHF Novato performed in 1991 concluded that radon concentrations were well below the EPA action level of four picocuries per liter. No evidence of ASTs, current or former lead issues, ordnance storage or use, potential contaminant migration from neighboring properties, spills/incidents with and without approved cleanup, unconventional building demolition, or USTs was identified for Zone H.

Based on a review of Zone H environmental issues (including a site walk) with Cal EPA, US EPA, and RWQCB representatives, the only issue requiring additional investigation in Zone H is soil beneath a 55-gallon drum of waste oil observed on Parcel 126 during the site inspection. The drum was supported by a wooden pallet in an unpaved area of the parcel. The drum was observed to be partially full, rusty, and unlabeled. No leaks or stains were observed in the area of the drum.

Parcel 126 also contained a flammable storage cabinet and a Conex box for storage of the contractors equipment. The containers were locked at the time of the site visit, but it is likely that fuels and/or oils were stored in these containers. No leaks or stains were observed at the time of the inspection.

Summary

As formerly noted, Parcels 125, 127, and 128 have received written agency concurrence as BRAC Category 1 parcels.

Environmental concerns must be resolved before Parcel 126 can be reclassified from BRAC Category 7 to another BRAC category.

Environmental issues such as asbestos, lead-based paint, and oil-filled electrical equipment need to be sampled for and/or disclosed in accordance with DOD policy, but do not affect BRAC classifications.